

**ELECTRICAL DATA AUTOMATED SYSTEM USING WI-FI,
COLLABORATION WITH ETHYLENE/POLYETHYLENE(M) SDN.BHD**

By

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FINAL REPORT

**Submitted to the Electrical & Electronics Engineering Programme
in Partial Fulfillment of the Requirements
for the Degree
Bachelor of Engineering (Hons)
(Electrical & Electronics Engineering)**

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CERTIFICATION OF APPROVAL

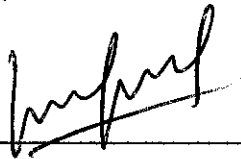
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Noor Aini binti Mohamad

A project dissertation submitted to the
Electrical & Electronics Engineering Programme
Universiti Teknologi PETRONAS
in partial fulfilment of the requirement for the
Bachelor of Engineering (Hons)
(Electrical & Electronics Engineering)

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December 2007

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



NOOR AINI BINTI MOHAMAD

ABSTRACT

The objective of this report is to obtain the current progress of the activity; Development Equipment Data Using WiFi Automated System. This project is collaboration with a company during my industrial internship which is at Ethylene/Polyethylene (M) Sdn.Bhd (EPEMSB).

Recently in EPEMSB, the engineers have problems with equipment in plant. The effect of these problems, they need to find the history behind of these problems occurs. Most of the book records are in not good condition and outdated. Some of the data cannot be finding anymore. The project is carried to solve the problem that will make the system effectively to save time and improve job performance. Besides using Wireless Fidelity (WiFi) automated system in plant, one of the other things that will complete this project is to update equipment data with barcode scans by a barcode reader.

This report will discuss about the current status of the development database using WIFI and the theory used to complete this project. The results on the experiments that were done also include in this report. Besides that, the modifications from preliminary proposed design are also included in this report.

To put in a nut shell, this report documents the basic idea, current progress, experiment done and modifications of the development of web base by using WiFi. Thus, the result comprises of several forms which will act as the interface between database and user. This concept will implement for all substations in EPEMSB. All of them have the main purpose which is to ease and create simplicity for the current equipment data and other important records system applied to the substations in EPEMSB.

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LIST OF ABBREVIATIONS

EPMSB	Ethylene Polyethylene (M) Sdn.Bhd
WiFi	Wireless fidelity
RCA	Root cause analysis
PHP	Hypertext processor
SQL	Structure query language
WAP	Wireless access point
HTML	Hyper Text Mail Language
AP	Access Point
FTP	File Transfer Protocol
TCP/IP	Transmission Control Protocol over Internet Protocol
WLAN	Wireless Local Area Network
LAN	Local Area Network
IEEE	Institute of Electrical and Electronics Engineers
SSID	Service Set Identifier
AJAX	Asynchronous JavaScript and XML
XML	Extensible Markup Language
RF	Radio Frequency
OFDM	Orthogonal Frequency Division Multiplexing
OS	Operating System
PDA	Personal Digital Assistant
WEP	Wire Equivalent Privacy
MUFI	Metropolitan-Wide-WiFi

CHAPTER 1

INTRODUCTION

1.1 Background of study

Electrical data integration system is an integrated system that allows the staff from Electrical Section restricts Ethylene/Polyethylene (M) Sdn. Bhd (EPEMSB) to access details of the critical equipments in plant [1]. A personal computer (PC) will be located in each of the substations in plant and the main substation will act as main servers which have the privilege to control the system.

Each of the PCs will be linked via Wireless Local Area Network (WLAN) and normal Local Area Network (LAN) architecture. WLAN access point (AP) router will be located at a certain area to enable the connection from the clients and server wirelessly [2]. Figure 1 shows the suggested network architecture for this project. Application server and database server will act as the main server which will control the system and will be located at the main substation. Access points (APs) are base stations for the wireless network [2].

Access Point transmits and receives radio frequencies for wireless enabled devices to communicate with. While the clients can be mobile devices such as laptops, personal digital assistants (PDA), fixed devices such as desktops and workstations that are equipped with a wireless network interface [2]. This network architecture is the simplest form of exchanging data between computers. Lot of application developed with client-server based. The advantage of this architecture is that the security is controlled by the server [3][4][5].

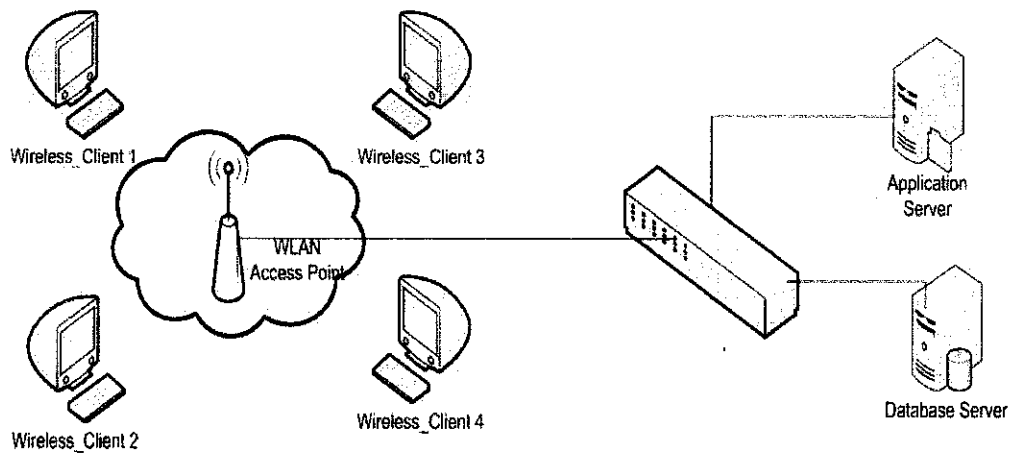


Figure 1: System Architecture [3]

A Wireless Local Area Network (WLAN) is a computer network that transmits and receives data with radio signals instead of wires. WLANs are used increasingly in both home and office environments, and public areas such as airports, coffee shops and universities. Innovative ways to utilize WLAN technology are helping people to work and communicate more efficiently. Increased mobility and the absence of cabling and other fixed infrastructure have proven to be beneficial for many users [3]. In order to make it more user friendly, barcode scanner will be used for automated updates data in plant. A barcode is a machine-readable representation of information which is usually dark ink on a light background to create high and low reflectance which is converted to black and white. Barcodes can be read by optical scanners called barcode readers or scanned from an image by special software [13][15].

By having this type of combination, it can be accessed by more users who interest to know the technical information especially in Electrical. It also will be very useful for every level of technical persons either in industry fields or in learning stage. This will give more benefits for the students and young engineers to enhance their knowledge in technical way. The equipment data system can efficiently become the reference point for the production and working environment due to its trustworthiness, reliability and accuracy.

1.2 Problem Statement

To find a history data, equipment data , drawing, predictive maintenance form is one of the problem in EPMSB especially problem investigation done for any equipments and also when they want to do checklist for preventive maintenance. This is very important when they want to perform a Root Cause Analysis (RCA) discussion among the principals. It was found that they require finding the data from the outdated sources and records. In some cases, certain of the records are missing. This may influence the delay of the RCA itself.

1.3 Objectives and Scope of Study

The main objective is to develop an Electrical Equipment Technical Report System that is easy to be accessed and user-friendly with full of technical information and applications.

In order to enhance the application of the technology, the project is also to develop and provide an installation of secure data by using WIFI at all substation in EPMSB in order to enhance more efficient and faster system.

Automatic updates data using barcode scanner for equipments in plant is applied to make the system more useful and effective.

Therefore, this communication concept needs to be developed for it commercial aspect for the plant requirement. As a result, the understanding on the operation of plant management system and the structure of development database by using any interface will be required.

There are several aspects need to be focused during completing this project. The aspects:

- The wireless application protocol
- A development of Hypertext Preprocessor (PHP) and Hypertext Mail Language (HTML) for interface and database to enhance the project
- The operation of the overall system
- Barcode system and scanner

CHAPTER 2

LITERATURE REVIEW

In order to decide which one is good or not is very subjective. It depends on the user very own perspective of applying the subject. The option that has been made need to relate to the objectives as those are the elements that would determine the accomplishment of a certain subject.

2.1 Client and Server Application

Client/server application is a network architecture that separates server from clients. Clients send the requests to server with a set of commands that is understood by the server. The client will waits for an acknowledgment from the server. The server transmits the requested data or information once the client has been acknowledged [4].

Despite the massive press coverage of client/server computing, there is much confusion around defining what the client/server is. Client and server are software and not hardware entities which in its most fundamental form, client/server involves a software entity (client) making a specific request which is fulfilled by another software entity (server) [5].

Figure 2 illustrates the client/server exchange. The client process sends a request to the server. The server interprets the message and then attempts to fulfill the request. In order to fulfill the request, the server may have to refer to a knowledge source (database), process data (perform calculations), control a peripheral, or make an additional request of another server. In much architecture, a client can make requests of multiple servers and a server can service multiple clients [5][6].

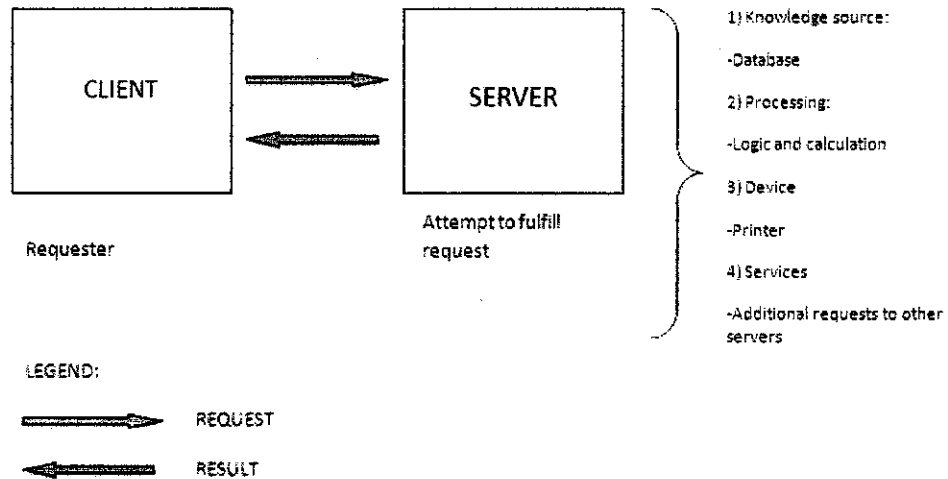


Figure 2: Client/Server Transaction [6]

2.2 Local Area Network and Wireless Network

Local Area Network (LAN) is referred to the structure of how computers and network devices are connected. There are three basic types of cables which are twisted pair, coaxial and fiber optic. There are six types of LAN topologies which are star, point-to-point, multipoint, hierarchical, bus and ring. Usually, Ethernet bus topology (Figure 3) is widely used for client/server application [3]. Network repeaters are used in this topology to forwards network signals from one segment to the other. Therefore, multiple users can access this network topology without failure when one of the network's users disconnected [5].

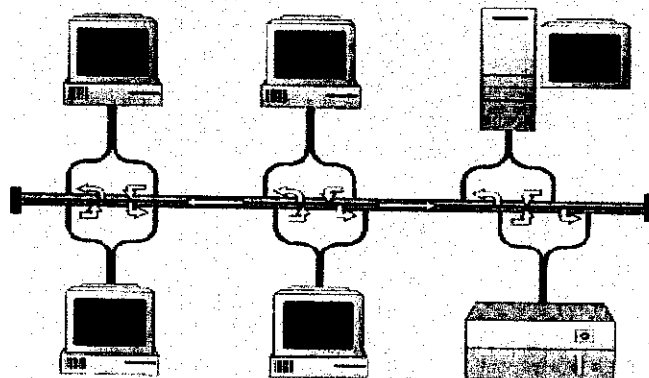


Figure 3: Ethernet Bus Topology [3]

2.2.1 Wireless LAN

A Wireless Local Area Network (WLAN) is a wireless local area network, which is the linking of two or more computers without using wires. WLAN utilizes spread-spectrum or Orthogonal Frequency Division Multiplexing (OFDM) modulation technology based on radio waves to enable communication between devices in a limited area, also known as the basic service set. This gives users the mobility to move around within a broad coverage area and still be connected to the network [4].

Access point router (AP) is used to broadcast the service set identifier (SSID) of the wireless network. To enable the connection between WLAN client and the AP, each client must have wireless adapter installed. Once the client is detecting the SSID of the AP, the client needs to authenticate to the AP either using Wire Equivalent Privacy (WEP) or WiFi Protected Access (WPA) in order to access the WLAN network (depend on the AP router settings) [2]-[5].

An Infrastructure network contains an access point or a wireless router. The Infrastructure Network example shown on the following figure contains the following D-Link network devices:

- 1) A laptop computer with a wireless adapter -D-Link *AirPlus Xtreme*™ G DWL-G650
- 2) A desktop computer with a wireless adapter -D-Link *AirPlus Xtreme*™ GTM DWL-G520
- 3) A cable modem - D-Link DCM-201
- 4) A wireless router - D-Link *AirPlus Xtreme*™ GTM DI-624
- 5) A wireless access point -D-Link *AirPlus Xtreme*™ GTM DWL-2100AP

It clearly illustrated in the Figure 4 [1].

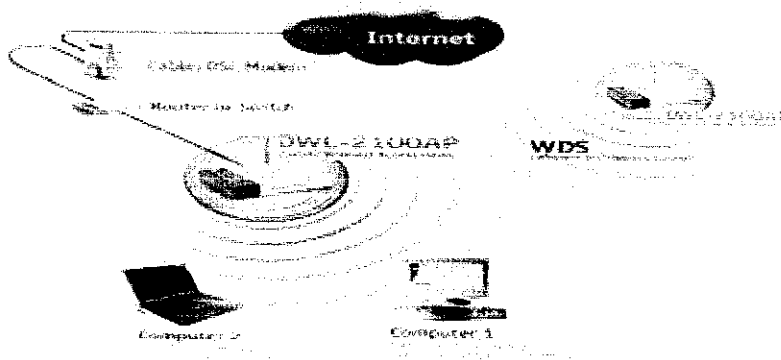


Figure 4: Setting Up a Wireless Infrastructure Network [1]

2.2.2 Wireless Fidelity

Wi-Fi technologies have gone through several generations since their inception in 1997. Wi-Fi is supported to different extents under Microsoft Windows, Apple Mac OS and open source Unix and Linux operating systems[7].

A Wi-Fi enabled device such as a PC, cell phone or PDA can connect to the Internet when within range of a wireless network connected to the Internet. The area covered by one or several interconnected access points is called a hotspot. Hotspots can cover as little as a single room with wireless-opaque walls or as much as many square miles covered by overlapping access points. Wi-Fi can also be used to create a mesh network. Both architectures are used in community networks [7].

Wi-Fi also allows connectivity in peer-to-peer (wireless ad-hoc network) mode, which enables devices to connect directly with each other. This connectivity mode is useful in consumer electronics and gaming applications.

When the technology was first commercialized there were many problems because consumers could not be sure that products from different vendors would work together. Many consumer devices use Wi-Fi. Amongst others, personal computers can network to each other and connect to the Internet, mobile computers can connect to the Internet from any Wi-Fi hotspot, and digital cameras can transfer images wirelessly [8].

Routers which incorporate a cable modem and a Wi-Fi access point are often used in homes and other premises, and provide Internet access and internetworking to all devices connected wirelessly or by cable into them. Devices supporting Wi-Fi can also be connected in ad-hoc mode for client-to-client connections without a router.

In addition to restricted use in homes and offices, Wi-Fi is publicly available at Wi-Fi hotspots provided either free of charge or to subscribers to various providers. Free hotspots are often provided by businesses such as hotels, restaurants, and airports who offer the service to attract or assist clients. Sometimes free Wi-Fi is provided by enthusiasts, or by organizations or authorities who wish to promote business in their area. Metropolitan-wide WiFi (Mu-Fi) already has more than 300 projects in process [7][8].

2.3 The Database Management System Interface Software

2.3.1 Web base subsequent

Subsequently, once medium for connection has been develop, automatically database should be done appropriately. To complete this project, web base has been choose to entire the database.

Web base is actually connecting the database to the web. Individual Web pages, or whole Web sites, can be generated dynamically based on database contents. Web Base helps to build Web applications that are completely state aware, tracking interactions with each and every user. To run and complete the system, Structured Query Language (My SQL) and Hypertext Preprocessor (PHP) language are very important tools need to know indeed [6][9].

2.3.2 MySQL

Structured Query Language (SQL) and is a pioneering effort on the World Wide Web. SQL allows users to access data in relational database management systems, such as Oracle, Sybase, Informix, Microsoft SQL Server, Access, and others, by allowing users to describe the data the user wishes to see. SQL also allows users to define the data in a database, and manipulate that data.

SQL is an American National Standards Institute (ANSI) standard computer language for accessing and manipulating database systems.

There are many different versions of the SQL language, but to be in compliance with the ANSI standard, they must support the same major keywords in a similar manner (such as SELECT, UPDATE, DELETE, INSERT, WHERE, and others) [6],[10]-[12].

Figure 5 below shows that My SQL act as a server that keeps the data base for the system. The focal person will have the privilege to directly deal with the database system.

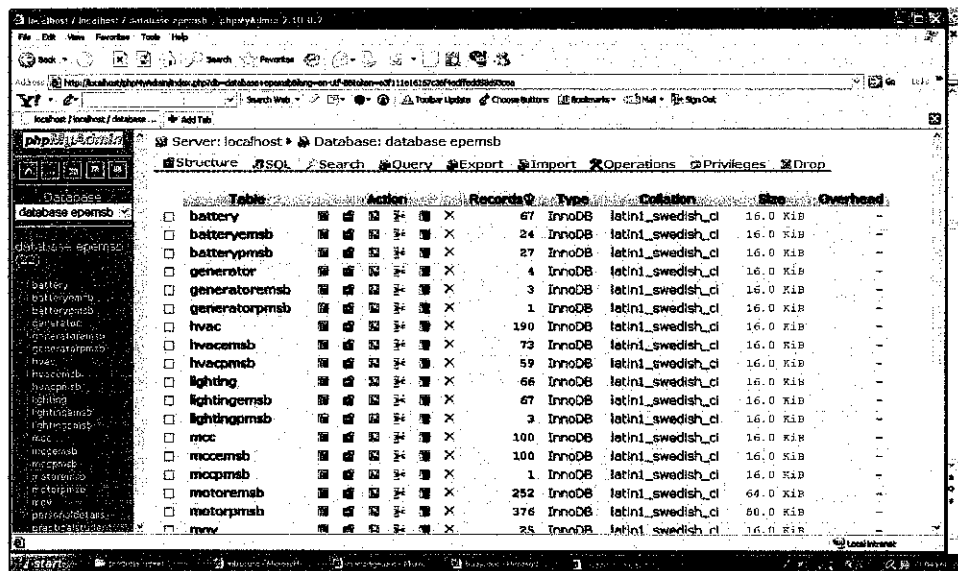


Figure 5: Database in My SQL

2.3.3 PHP Language

Hypertext Preprocessor (PHP) is a language that has outgrown its name. It was originally conceived as a set of macros to help coders maintain personal home pages, and its name grew from its purpose. Since then, PHP's capabilities have been extended, taking it beyond a set of utilities to a full-featured programming language, capable of managing huge database-driven online environments [10][112].

It is a server-side scripting language often written in an Hypertext Mail Language (HTML) context. Unlike an ordinary HTML page, a PHP script is not sent directly to a client by the server; instead, it is parsed by the PHP engine. HTML elements in the script are left alone, but PHP code is interpreted and executed. PHP code in a script can query databases, create images, read and write files, talk to remote servers. The output from PHP code is combined with the HTML in the script and the result sent to the user [10][11].

Figure 6 and Figure 7 shows that windows for PHP language and HTML language used in the system. Both of the languages has been put in the different file, so that the focal person easy to troubleshoot the errors.

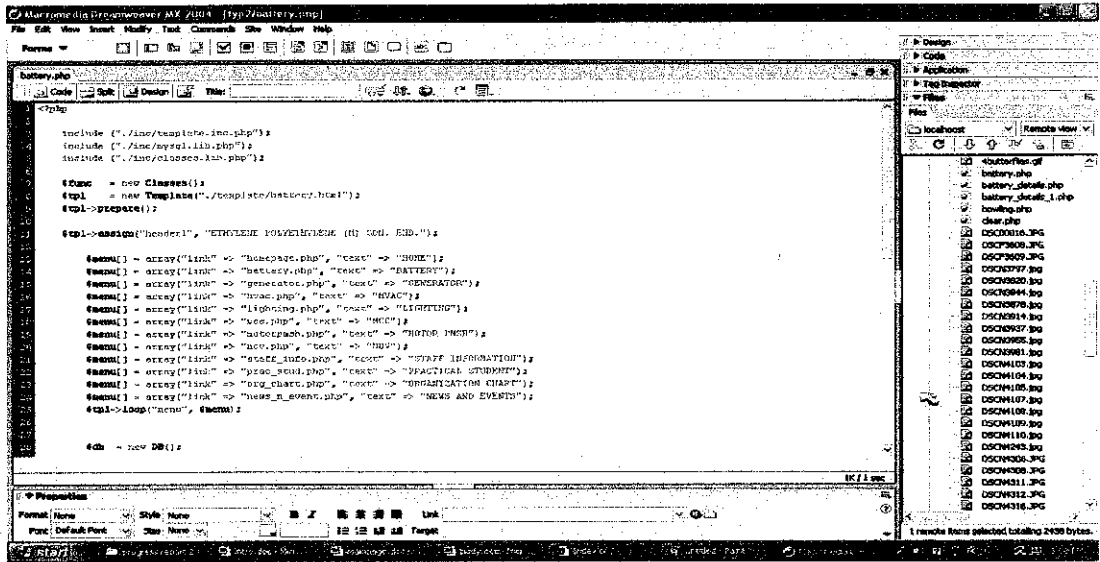


Figure 6: Windows for PHP language

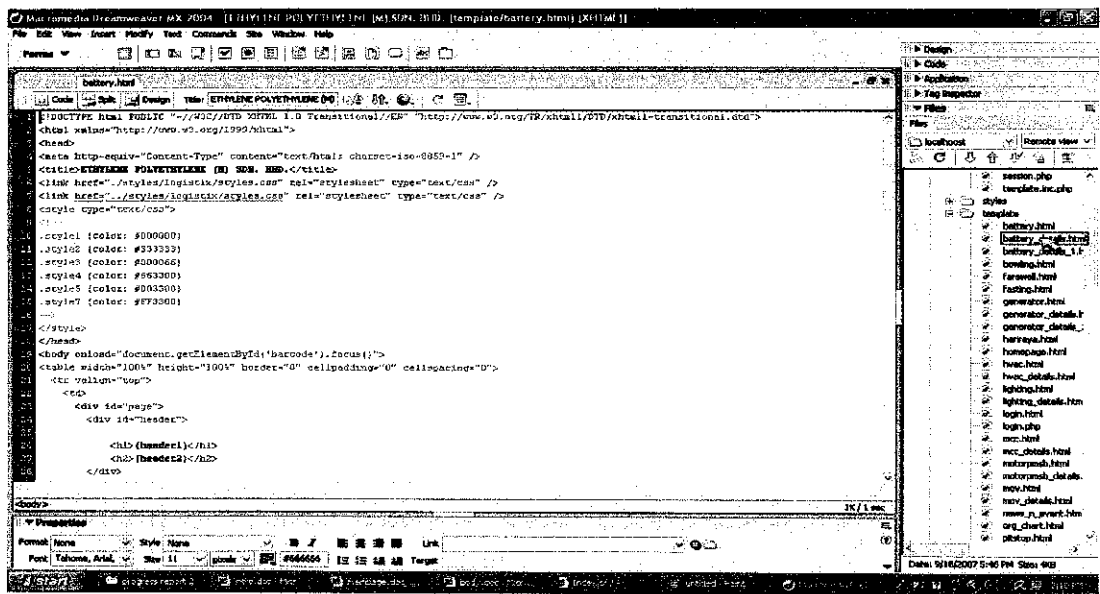


Figure 7: Windows for HTML language

2.3.4 Ajax system

Asynchronous JavaScript and Extensible Markup Language (XML)-(AJAX), is a web development technique used for creating interactive web applications. The intent is to make web pages feel more responsive by exchanging small amounts of data with the server behind the scenes, so that the entire web page does not have to be reloaded

each time the user requests a change. This is intended to increase the web page's interactivity, speed, functionality, and usability.

Ajax is asynchronous in that extra data is requested from the server and loaded in the background without interfering with the display and behavior of the existing page. JavaScript is the scripting language in which Ajax function calls are usually made. Data is retrieved using the XMLHttpRequest object that is available to scripting languages run in modern browsers. There is, however, no requirement that the asynchronous content is formatted in XML [13][14].

It will allow the programmer to build web applications and involves at least 3 technologies which are;

- HTML(Hypertext Markup Language) for web pages
- JavaScript
- XML (Extensible Markup Language) for the data

2.3.4.1 Advantages of AJAX system

- Efficient

Only a part of the web page that needs to be modified is being modified.

- Lightweight

Only small amount of data (in the XML form) are being exchange through the internet, will making the web applications very fast [15].

In order to make the system reliable and apply for the plant in EPMSB, barcode applications need to be done utterly.

2.4 Barcode Scanner

All barcodes which available in the market are almost same each other but actually some of them have several different widths of black bars, while others only have two-one narrow and one wide. Some are longer or taller while others are more compressed and shorter. In fact, there are over 100 different barcode symbologies. There is no barcode has a universal business application and that is why it is necessary for barcode shoppers to find the symbology which works best for their company or for their specific applications. Indeed, many companies use at least two different symbologies [16].

A barcode scanner has two components which are a device to produce an electronic signal representing the bars and spaces of a barcode, and a decoder that converts the electrical signals into a digital format for input to a computer. Together the barcode scanner and decoder are sometimes referred to as a barcode reader [16][17].

2.4.1 The benefits of barcode

Barcode scanner offers a number of benefits. Some are as stated below:

- Improve operational efficiency
- Save time
- Reduce errors
- Cut costs
- Benefit from customer or regulatory requirement[21]

Since barcodes permit faster and more accurate recording of information, work in process can move quickly and be tracked precisely.

2.4.2 Printer Quality and Contrast

Poor printing quality can lead to unreadable symbols by changing various attributes of the bars. Misprints can add or subtract from bar widths and add stray elements to the symbol. Alignment can also be problem when printing in multiple color layers. Print contrast is the color difference between black bars and white bars [18]. This contrast is equivalent to the contrast between the reflected and non-reflected light of the scanner. If there is not a sufficient print contrast, the threshold points of the scanned data will never be reached, and the scanner will not read the symbol.

There are a lot of types of barcodes application reliable in the system today. To make this project entirely has same standard with the scanner, barcode 39 has been choose to read from barcode scanner and it will generate automatically from the database system itself.

2.4.3 Barcode 39

Code 39 and also sometimes called Code 3 from 9 is a discrete barcode. This means that a fixed pattern of bars represents a single character. Each character is made up of 9 bars - 3 of which are wider than the others. In this context a bar can be the printed black bar or the white space between the bars. A single character therefore consists of 5 black bars and 4 white bars. The ratio of the bar widths can range from 2.2:1 to 3:1. To read a barcode reliably the decoder must be able to differentiate between the wide and narrow bars [18][19].

The space between each barcode character is called 'the inter character gap'. Its width is undefined but is usually equivalent to a narrow white bar. The widths of the wide and narrow sets of elements should all be the same but in practice most printing processes incur 'ink spread'. This widens the bars at the expense of the spaces. This effect is most noticeable on narrow elements sometimes making the barcodes very difficult to scan with some decoders [20].

The Code 39 barcode symbology supports 43 characters plus an additional character used as a delimiter or start/stop character. The start/stop character always occurs as the first and last character in a complete barcode and is represented in the human readable text by the (*) character [18].

The 43 character set includes the following:

1234567890ABCDEFGHIJKLMNPOQRSTUVWXYZ - . \$ / + % SPACE

Figure 8 shows the bar configuration for each character in the Code 39 set. Note that the (*) character is used only for the start/stop character. It must be the first and last character appearing in the complete barcode [18][19].

Char.	Pattern	Bars	Spaces	Char.	Pattern	Bars	Spaces
1		10001	0100	M		11000	0001
2		01001	0100	N		00101	0001
3		11000	0100	O		10100	0001
4		00101	0100	P		01100	0001
5		10100	0100	Q		00011	0001
6		01100	0100	R		10010	0001
7		00011	0100	S		01010	0001
8		10010	0100	T		00110	0001
9		00110	0100	U		10001	1000
0		10001	0010	W		01001	1000
A		01001	0010	X		11000	1000
B		11000	0010	Y		00101	1000
C		00101	0010	Z		10100	1000
D		00101	0010	-		01100	1000
E		10100	0010	Space		00011	1000
F		01100	0010	*		10010	1000
G		00011	0010	+		01010	1000
H		10010	0010	\$		00110	1000
I		01010	0010	/		00000	1101
J		00110	0010	%		00000	1101
K		10001	0001				
L		01001	0001				

Figure 8: Configuration table for each character in Code 39 [18]

2.4.4 Methods of networking

There are a few methods that should know in the barcode networking which is wireless networking and types of the connector.

2.4.4.1 Wireless Networking

Modern handheld barcode readers are operated in wireless networks according to IEEE 802.11g (WLAN) or IEEE 802.15.3 (Bluetooth). However, such configuration limits the time of operation from battery or rechargeable battery and required at least after a shift of operation [22].

2.4.4.2 Types of Connectors

Most barcode readers use a PS/2 or USB (Figure 9) cable for output. PS/2 cables are connected to the host computer in a Y formation, the PS/2 keyboard port with its first end, to the keyboard with its second, and to the barcode reader with its third end. The barcode characters are then received by the host computer as if they came from its keyboard decoded and converted to keyboard input within the scanner housing. This makes it easy to interface the bar code reader to any application that is written to accept keyboard input [22].

Many readers can also be equipped with an RS-232 output port so that the decoded characters arrive at the computer via one of its RS-232 connectors [22].

USB is supported by many newer scanners. There are a few other less common interfaces. Wand emulation is another output type that takes the raw wave and decodes it, normalizing the output so it can be easily decoded by the host device. Wand emulation can also convert symbologies that may not be recognized by the host device into another symbology which is typically Code 39 that can be easily decoded [22].



Figure 9: PS/2 port [22]

CHAPTER 3

PROJECT OVERVIEW METHODOLOGY

3.1 Procedure Identification

The process of completing this project involves several components and distinct stages. Figure 10 shows the system integration that have been used in this project which involves input from the system, computer and output in the database. Basically as an input, user scans the barcode which is tag no of the equipment in plant. Wi-Fi acts as a connection to make it communicate with the master database. Finally, user gets the output which they can display the information at the database.

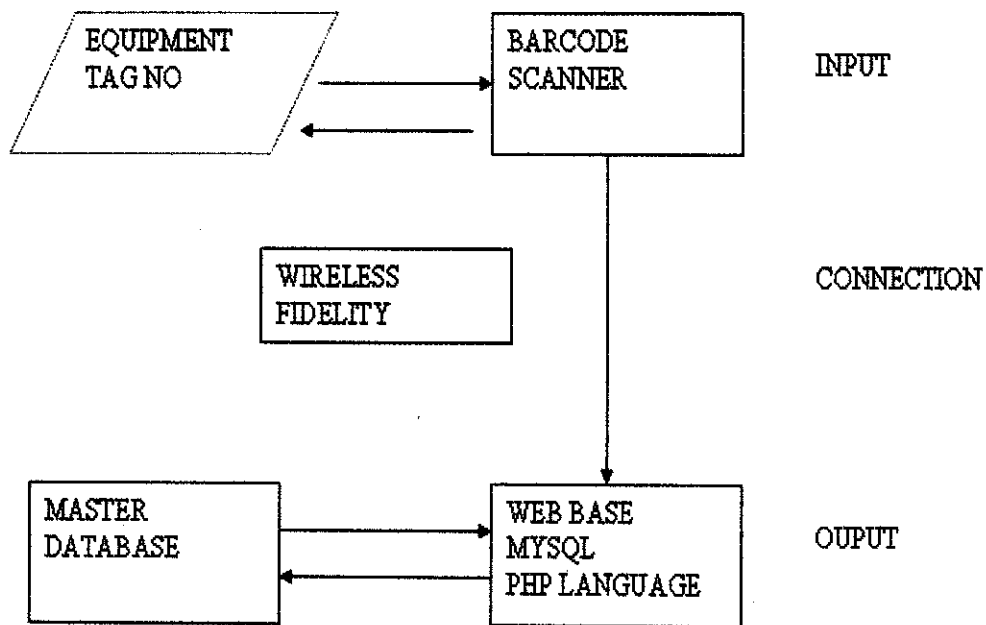


Figure 10: System Integration between barcode scanner and the system

3.2 Architecture of web application for equipment data

There are several important steps in the system model of electrical data integration system for staff using barcode scanner and Wi-Fi. The architecture of the web application for equipment data is explained in Figure 11.

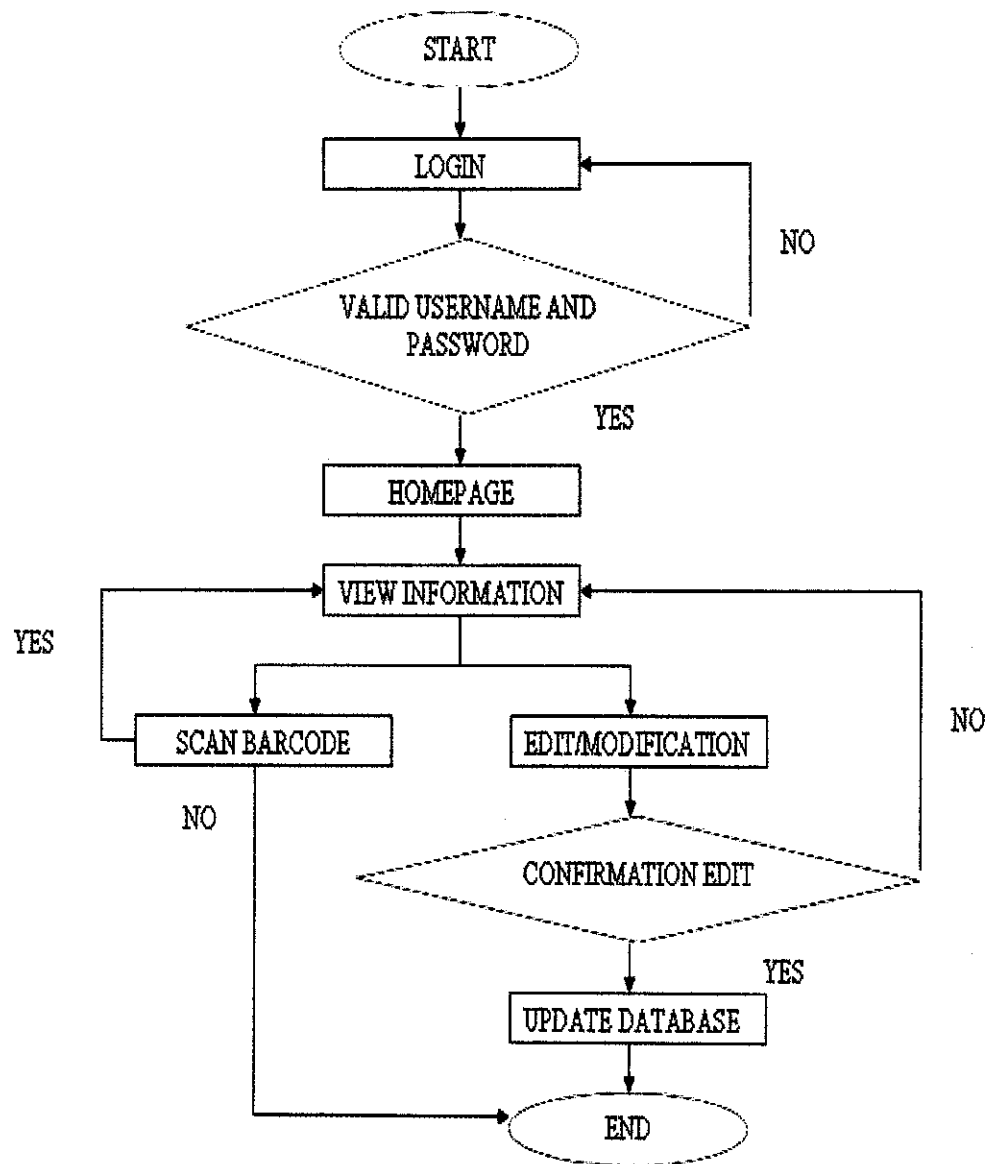


Figure 11: Flow chart of equipment data by using Web base

3.3 Hardware and Software

Two hardware involve in the implementation of the system which are barcode scanner and computer to act as the server. The barcode scanner is selected based on the range of supported fonts, reliability, quality and availability in the market.

The first step of software development is actually the development of the database itself. By having the combination of MySQL, PHP language and Macro dreamweaver as components to complete the system, it will make the system become more understanding with the wireless development. New barcode also has been produced by this system itself and need to print out. The printed barcode has been used and put onto each of the equipment.

In the early stage, the database consists of only Access file shared by all users. The main database which acts as a server will be in the Main Substation, and then all the users only from Electrical Department can access this system with the password given from any substation. They can update data details of the equipment and can check out information for critical equipments in plant.

The Wireless Fidelity plays the main roles for communicate between substations to the other substation. Wireless Application Protocol has been used to support the application.

For objects that require more control over the custom application, PHP and HTML language plays the role to perform the action defined by users. To do this, an ample understanding and knowledge on the programming language is required. It can speed up the development process while providing better performance in future.

CHAPTER 4

RESULT AND DISCUSSION

4.1 First Prototype

The first prototype of this project was completed during the first half of the given timeframe. System was tested and focused on the application of the system itself. Below are the examples of interface used in the system. Figure 12 shows the log in page and user should fill the username and password.



Figure 12: Log in page first prototype

Once user login, the main page will be displayed (Figure 13). If user put the wrong username and password or user's account is not in the database system (which indicates that the user is not from electrical department), error page will appear to request user to re-enter the right username and password (Figure 14).

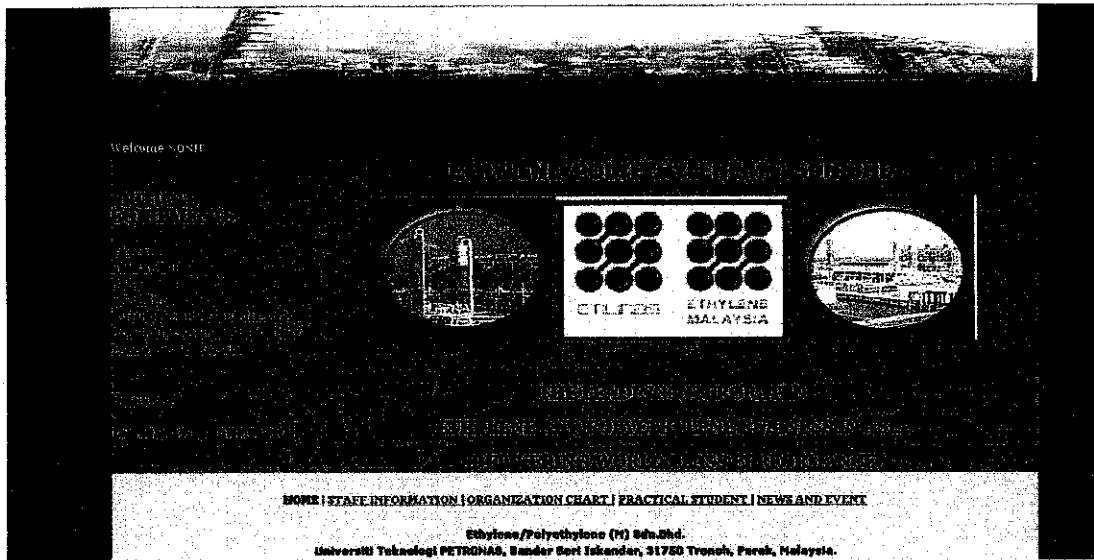


Figure 13: Homepage first prototype

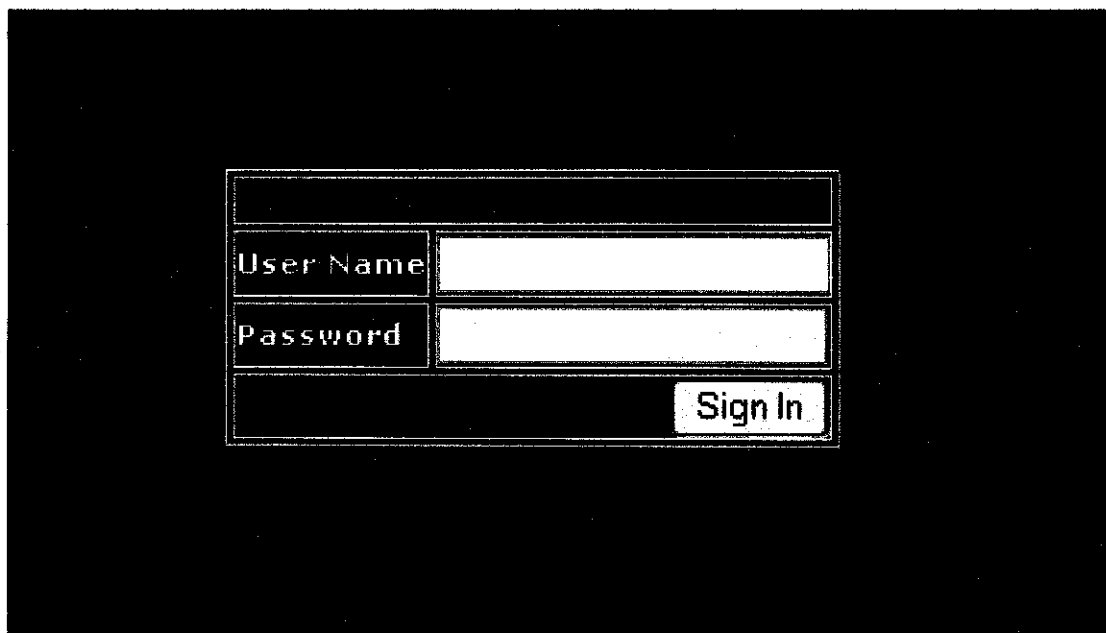


Figure 14: Log in error

In the BATTERY page (Figure 15), user will get to know the type, model, and other important information regarding the battery used in a specified company. By selecting the needed location, user can modify the data using 'DELETE' or 'UPDATE' application (Figure 16).

Location	Manufacturer	Type	Model	Capacity	Voltage	Count	Barcode
Office Utility Control Room SEKVA 24V AC	EMSB	SAFT Sweden	Nickel Cadmium	SBA1 349	149	165	71
Main Substation Control 24V DC	EMSB	SAFT Sweden	Nickel Cadmium	NSH 31			10
PA System Admin Building	EMSB	Local	Valve Regulated Lead Acid (VRLA)			2	80
PA System Control Room	EMSB	Local	Valve Regulated Lead Acid (VRLA)			2	81
F&G Panel Training Center	EMSB	Local	Valve Regulated Lead Acid (VRLA)			2	82

Figure 15: Battery page first prototype

Ethylene substation 110V DC
EMSB
SAFT Sweden
Nickel Cadmium
SBL 199-2
199
78
Update Delete

Figure 16: "Update" and "Delete" application first prototype

4.2 Second Prototype

The second prototype focused on the barcode scanner implementation. The system was designed to fulfill the needs from the company to assist the user to get the important data from the equipments.

New interface has been modified from the previous prototype 1 (Figure 17). This prototype has used AJAX as a medium to develop a new interface while using the same method. Beside critical equipments, new information has been added which are about news and events, and other information about the department.

Additional application has been implemented in database system which is barcode scanner. To use the system, user must first enter the address of the database. When the address has been called, the main page will be displayed (Figure 17).

ETHYLENE POLYETHYLENE (M) SDN. BHD.

HOME BATTERY GENERATOR HVAC LIGHTING MCT MOTOR NEWS NAVY STAFF INFORMATION PRACTICAL STUDENT ORGANIZATION CHART NEWS AND EVENTS

A LEADING OIL AND GAS MULTINATIONAL OF CHOICE

THE LEADING INTERGRATED ETHYLENE AND POLYETHYLENE BUSINESS IN ASIA DELIVERING WORLD CLASS PERFORMANCE

CRITICAL EQUIPMENTS
[BATTERY](#)
[GENERATOR](#)
[HVAC](#)
[LIGHTING](#)
[MOTOR CONTROL CIRCUIT \(MCC\)](#)
[MOTOR OPERATED VALVED \(MOV\)](#)

NEWS AND EVENTS
[BOWLING 2007](#)
[FASTING MONTH 2007](#)
[FAREWELL PARTY 2007](#)
[HARI RAYA 2007](#)
[PITSTOP 2007](#)

OTHERS
[STAFF INFORMATION](#)
[ORGANIZATION CHART](#)
[PRACTICAL STUDENT](#)

[SIGN OUT](#)

TODAY:
09/26/2007 2:13 PM

Figure 17: Log in page

When user scans the barcode (Figure 18), the system will retrieve from the scanner and the details of the equipment will display (Figure 19).



BATTERY

Battery Barcode:

 Company:

Barcode was scanned here

TECHNICAL INFORMATION

LOCATION	COMPANY	MANUFACTURE	TYPE	MODEL	CAPACITY AMP HOUR	NO OF CELL
Main Substation DG set control panel		Local	Valve Regulated Lead Acid (VRLA)			2
Main Substation Gen set 250 DC	EMSB	Soft Sweden	Nickel Cadmium	NSH 32		
PA System Admin Building	EMSB	Local	Valve Regulated Lead Acid (VRLA)			2
PA System Control Room	EMSB	Local	Valve Regulated Lead Acid (VRLA)			2
ESG Panel Training Center	EMSB	Local	Valve Regulated Lead Acid (VRLA)			2
ESG Panel Cardroom	EMSB	Local	Valve Regulated Lead Acid (VRLA)			2
ESG Panel Administration Building	EMSB	Local	Valve Regulated Lead Acid (VRLA)			2
ESG Panel Ware House	EMSB	Local	Valve Regulated Lead Acid (VRLA)			2

Figure 18: Snapshot of the BATTERY page



BATTERY

Battery Barcode:

 Company:

TECHNICAL INFORMATION

LOCATION	COMPANY	MANUFACTURE	TYPE	MODEL	CAPACITY AMP HOUR	NO OF CELL
Main Substation DG set control panel		Local	Valve Regulated Lead Acid (VRLA)			2

PAGE 1 | FROM 1

Figure 19: Details of the equipment that has been scanned

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The preliminary goal for this project is to construct a database system to keep records of the equipment's details and information about Electrical Department Ethylene/Polyethylene (M) Sdn. Bhd by using Wireless Fidelity with automated system. Successfully, it was achieved. The system is expected to meet the requirement by the staff especially from Electrical Department to improve job performance.

From the database that has been constructed, it is important to know how to integrate the interface between barcode scanner and personal computer where the scanner acts as the information input. Code reads from the new barcode which generate from the system itself and the details of the equipment will be displayed in the system.

In this project, data communication area has been studied. Based on the facts, data communication network works as an entity, where it is necessary to understand the fundamental concepts and components that makeup the network [20]. This is where the comprehensive understanding of the barcode reading coming from.

To put in a nut shell, the target has been achieved in the frame of time. It depends on the company to continue this project and improve it for the better features and applications in the future.

5.2 Recommendations

To enhance this project, further study need to be done on barcode scanner, computer system and communication system. The company intents to use barcode scanner which automatically scan the barcode and update the data in the PDA which it can stored all the history and current records. These scanners generally include a keyboard and display so that the operator can send a variety of data to the computer and receive responses.

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APPENDICES

APPENDIX A

GANTT CHART SEMESTER 1

APPENDIX B

GANTT CHART SEMESTER 2

ID	Task Name	Start	Finish	Duration	Aug 2007							Sep 2007							Oct 2007							Nov 2007						
					8/5	8/12	8/19	8/26	9/2	9/9	9/16	9/23	9/30	10/7	10/14	10/21	10/28	11/4	11/11	11/18	11/25	12/2										
1	Enhance interface of the system	7/23/2007	10/31/2007	14.6w	[Gantt bar from 7/23/2007 to 10/31/2007]																											
2	Barcode coding	8/1/2007	8/22/2007	3.2w	[Gantt bar from 8/1/2007 to 8/22/2007]																											
3	Barcode coding with the system	8/22/2007	9/7/2007	2.6w	[Gantt bar from 8/22/2007 to 9/7/2007]																											
4	Enhancement project	9/3/2007	10/19/2007	7w	[Gantt bar from 9/3/2007 to 10/19/2007]																											
5	Progress report 1	8/17/2007	8/17/2007	2w	[Gantt bar from 8/17/2007 to 8/17/2007]																											
6	Progress report 2	9/21/2007	9/21/2007	2w	[Gantt bar from 9/21/2007 to 9/21/2007]																											
7	Draft report	10/22/2007	10/22/2007	2w	[Gantt bar from 10/22/2007 to 10/22/2007]																											
8	Final report (soft cover)	11/7/2007	11/7/2007	2w	[Gantt bar from 11/7/2007 to 11/7/2007]																											
9	Technical report	11/12/2007	11/12/2007	2w	[Gantt bar from 11/12/2007 to 11/12/2007]																											
10	Oral presentation	12/7/2007	12/7/2007	2w	[Gantt bar from 12/7/2007 to 12/7/2007]																											
11	Final report (hard cover)	12/21/2007	12/21/2007	2w	[Gantt bar from 12/21/2007 to 12/21/2007]																											

APPENDIX C

- A)PHP LANGUAGE**
- B)HTML LANGUAGE**
- C)JAVA SCRIPT**

PHP LANGUAGE

```

include ("./inc/template.inc.php");
include ("./inc/mysql.lib.php");
include ("./inc/classes.lib.php");

$func = new Classes();
$tpl = new Template("./template/battery.html");
$tpl->prepare();

$tpl->assign("header1", "ETHYLENE POLYETHYLENE (M) SDN. BHD.");

$menu[] = array("link" => "homepage.php", "text" => "HOME");
$menu[] = array("link" => "battery.php", "text" => "BATTERY");
$menu[] = array("link" => "generator.php", "text" => "GENERATOR");
$menu[] = array("link" => "hvac.php", "text" => "HVAC");
$menu[] = array("link" => "lighting.php", "text" => "LIGHTING");
$menu[] = array("link" => "mcc.php", "text" => "MCC");
$menu[] = array("link" => "motorpmsb.php", "text" => "MOTOR PMSB");
$menu[] = array("link" => "mov.php", "text" => "MOV");
$menu[] = array("link" => "staff_info.php", "text" => "STAFF INFORMATION");
$menu[] = array("link" => "prac_stud.php", "text" => "PRACTICAL STUDENT");
$menu[] = array("link" => "org_chart.php", "text" => "ORGANIZATION CHART");
$menu[] = array("link" => "news_n_event.php", "text" => "NEWS AND EVENTS");
$tpl->loop("menu", $menu);

$db = new DB();
$row = array();
$select = "SELECT * \n";
$from = "FROM battery \n";
$where = "WHERE ".$func->condition("id", "equal", "barcode", "form")." \n".
        "AND ".$func->condition("location", "contains", "location", "form")." \n";
$order = "ORDER BY location \n";
$limit = "";
$total = "SELECT COUNT(*) \n" . $from . $where;
$db->query($total);
if ($db->next_record()) $total = $db->f[0];
else $total = 0;
$page = $func->Get("page", 1);
$r_page = $func->Get("r_page", 10);
$off_set = ($page - 1) * $r_page;
$max_page = ceil($total / $r_page);
$limit = "LIMIT ".$off_set .", ". $r_page;

$sql = $select . $from . $where . $order . $limit;
$db->query($sql);
while ($db->next_record()) {
    $row[] = array("Location" => $db->f["Location"],
                  "Company" => $db->f["Company"],
                  "Manufacture" => $db->f["Manufacture"],
                  "Type" => $db->f["Type"],
                  "Model" => $db->f["Model"],
                  "Capacity_Amp_Hour" => $db->f["Capacity_Amp_Hour"],
                  "No_of_cell" => $db->f["No_of_cell"],
                  "link" => $db->f["id"]);
}
$db->close();
$tpl->loop("battery", $row);
$func->navigation("content", "book.php", $max_page);

$tpl->PrintToScreen();

```

HTML LANGUAGE

```

<!DOCTYPE html>
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=iso-8859-1" />
<title>ETHYLENE POLYETHYLENE (M) SDN. BHD.</title>
<link href="./styles/logistix/styles.css" rel="stylesheet" type="text/css" />
<link href="./styles/logistix/styles.css" rel="stylesheet" type="text/css" />
<style type="text/css">
--
<style1 {color: #000000}
<style2 {color: #333333}
<style3 {color: #000066}
<style4 {color: #663300}
<style5 {color: #003300}
<style7 {color: #FF3300}
.
</style>
<body onload="document.getElementById('barcode').focus()">
<table width="100%" height="100%" border="0" cellpadding="0" cellspacing="0">
<tr valign="top">
<td>
<div id="page">
<div id="header">
<h1>{header1}</h1>
<h2>{header2}</h2>
</div>
<div id="menu">
<ul>
<!-- START BLOCK : menu -->
<li><a href="{link}">{text}</a></li>
<!-- END BLOCK : menu -->
</ul>
</div>
<div id="content">
<div id="post">
<div class="boxed">
<h2 class="title style1">BATTERY</h2>
<div class="content">
<form action="" method="post" name="search" id="search">
<fieldset>
<legend></legend>
<span class="style2">
<label for="inputtext1">Battery Barcode:</label>
</span>
<label for="inputtext1"><br />
</label>
<input id="barcode" type="text" name="barcode" value="" class="textfield" />
<label for="inputtext2"><br />
<span class="style2">Location:</span><br />
</label>
<input id="location" type="text" name="location" value="" class="textfield" />
<br />
<input id="submit" type="submit" name="submit" value="Search" class="button" />
<input type="button" name="Button" value="Insert" onclick="parent.location='batte
details_1.php'" />
</fieldset>
</form>
</div>
</div>
<div class="boxed">
<h2 class="title">TECHNICAL INFORMATION </h2>
<div class="content">
<table width="964">
<tr>
<th width="125"><div align="left"><span class="style2">LOCATION</span></div></th>
<th width="96"><div align="left"><span class="style2">COMPANY</span></div></th>
<th width="139"><div align="left"><span class="style2">MANUFACTURE</span></div></th>
<th width="206"><div align="left"><span class="style2">TYPE</span></div></th>
<th width="101"><div align="left"><span class="style2">MODEL</span></div></th>
<th width="141"><div align="left"><span class="style2">CAPACITY AMP HOUR</span></div>
<th width="124"><div align="left"><span class="style2">NO OF CELL</span></div></th>
</tr>

```

```

<tr class="{row}">
    <td><div align="left"><a href="battery_details_1.php?battery_id={link}" class="style
{Location}</a></div></td>
    <td><div align="left"><span class="style5">{Company}</span></div></td>
    <td><div align="left"><span class="style5">{Manufacture}</span></div></td>
    <td><div align="left"><span class="style5">{Type}</span></div></td>
    <td><div align="left"><span class="style5">{Model}</span></div></td>
    <td><div align="left"><span class="style5">{Capacity_Amp_Hour}</span></div></td>
    <td><div align="left"><span class="style5">{No_of_cell}</span></div></td>
</tr>
<!-- END BLOCK : battery -->
<!-- START BLOCK : navigation -->
<tr class="{row}">
    <td colspan="7"><span class="style7">PAGE</span>
    <!-- START BLOCK : page -->
    <a href="{str}" class="style4">{page_on}</a><span class="style7">{page_off} |{text}
    <!-- END BLOCK : page -->
    FROM {total}
    </span></td>
</tr>
<!-- END BLOCK : navigation -->
</table>
</div>
</div>
<div id="extra"></div>
</div>
</div>
</td>
</tr>
<tr>
    <td>
        <div id="footer">
            <p>Copyright &copy; 2007 . Designed by NoorAiniMohamad-UTP&#8482;</p>
        </div>
    </td>
</tr>
</table>
</body>
</html>

```


JAVA SCRIPT

```
var result;  
return confirm('ARE YOU SURE WANT TO UPDATE THIS DATA');  
return result;
```

```
ction ab() {  
var result;  
return confirm('ARE YOU SURE WANT TO DELETE THIS FILE');  
return result;
```

```
ction ac() {  
var result;  
return confirm('ARE YOU SURE WANT TO ADD THIS FILE');  
return result;
```