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Remote control through internet / Mohd Syazwan Zahari.

REMOTE CONTROL THROUGH INTERNET

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MAY 2006

“I hereby verify that I have read this report and I find it sufficient in terms of quality and scope to be awarded with the Bachelor’s Degree in Electrical Engineering ”



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Date : 3 MAY 2006

REMOTE CONTROL THROUGH INTERNET

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**This Report Is Submitted In Partial Fulfillment Of Requirements For The
Bachelor Degree of Electrical Engineering (Power Industry)**

**Faculty of Electrical (FKE)
Kolej Universiti Teknikal Kebangsaan Malaysia**

MAY 2006

“Hereby, I declare that this report is a result of my own research idea except for works that have been cited clearly in the references.”

SIGNATURE :



NAME : MOHD SYAZWAN ZAHARI

DATE : 2 MAY 2006

Specially dedicated to my family and friends ...

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ABSTRACT

This project is to design software and hardware which has the ability to control and operate every electrical appliance in every place which have internet support automatically by using our personal computer (PC) which that the system can be pre-program by user. Through it, knowledge in design and using programming language for interfacing purposes can be learns and improves. At early part of this project (PSM 1), the selection of the **QuickBASIC** program is for better fundamental understanding on computer program application in the computer interfacing. However, QuickBasic was changed to the **JavaScript** language adding with C programming (gcc version) for further function of interface circuit in PSM 2. This project will be separated to fourth main parts. The first part is designing the software for interfacing. The second part is finding and designing the hardware for the project. The third part is installing web-based technology which is Internet part to this project and the last one is joining the entire component that had been design. Security and safety measures are crucial to this project. It has close connection with the web-based technologies and knowledge on the controlling electrical devices. We can use any internet browser (e.g.: Internet Explorer, Netscape, Mozilla Firefox) to connect to the website where the instruments or devices are located. The web server will provide a web page, which enables user to enter the desired instruments or devices parameters and submit them to the web server back. The JavaScript language is combined with PHP and web Apache in Linux environment on the web server will determine whether the entered parameters are acceptable or not. If the entered parameters are acceptable, the PHP program will generate commands and transfer the commands to the PC to which the instrument is connected and controlled then the PC will execute the commands and acquire output of the instrument. The conception of this project can be applied to other purposes such as for security and reduce power consumption. From this project, a model for "Remote Control through Internet" is developed and successfully simulates the control electrical appliances.

ABSTRAK

Secara umumnya, projek ini adalah bertujuan untuk merekabentuk aturcara dan perkakasan yang membolehkan pengguna mengawal dan mengoperasikan setiap peralatan elektrik di setiap tempat kegemaran mereka yang mempunyai kemudahan Internet secara automatik menggunakan komputer. Melalui projek ini, pengetahuan dalam merekabentuk dan penggunaan bahasa pengaturcaraan untuk tujuan pengantaramukaan dapat dipelajari dan dipertingkatkan. Pemilihan penggunaan program **QuickBASIC** sebagai bahasa pengaturcaraan di peringkat awal projek ini (PSM 1) adalah disebabkan untuk mendalami penggunaan program komputer dalam pengantaramukaan komputer dari peringkat asas. Walaubagaimanapun, untuk membolehkan keberfungsian proses pengantaramuka menjadi lebih berkesan, program **QuickBasic** ditukar kepada **JavaScript** dan program C (versi gcc) dalam PSM 2. Projek ini terbahagi kepada 4 bahagian utama. Bahagian pertama akan memberi penekanan kepada gerak kerja penghasilan aturcara untuk pengantaramukaan dan data masukkan. Bahagian kedua pula adalah mengenalpasti komponen yang diperlukan dan mereka perkakasan untuk projek ini. Bahagian ketiga ialah mempelajari seterusnya mengaplikasi teknologi web berasaskan penggunaan Internet ke dalam pengoperasian projek dan bahagian yang terakhir adalah menggabungkan semua bahagian yang berkaitan menjadi satu sistem yang lengkap. Aspek keselamatan terhadap sistem amat dititikberatkan dalam projek ini. Ianya berkait rapat dengan teknologi dasar-web dan pengetahuan kawalan peralatan elektronik. Pengguna boleh menggunakan apa sahaja brosur Internet seperti *Internet Explorer*, *Netscape* atau pun *Mozilla Firefox* untuk mengakses data kepada laman web yang mempunyai alamat lokasi peralatan elektrik mereka. Server web berupaya menyediakan antaramuka web yang akan membolehkan pengguna memasukkan parameter peralatan elektrik yang mereka perlukan. Program JavaScript digabungkan dengan bahasa PHP ditambah dengan kendalian server web *Apache*, seterusnya disimulasikan dalam persekitaran *Linux* akan memastikan sama ada parameter masukan tersebut dapat diterima atau pun tidak. Daripada projek ini, satu model "Remote Control through Internet" telah dibina dan berjaya menjalankan simulasi bagi kawalan peralatan-peralatan elektrik yang dikehendaki.

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CHAPTER I

INTRODUCTION

1.1 OVERVIEW

The aims of developing this project, namely Remote Control through Internet, are to provide practical experimentation and learning more productive and efficient by harnessing modern technology. This project is created and developed to make works more easy and smooth.

In early part of this project (PSM 1), QuickBASIC language has been selected as the programming language for simulating a simple LED circuit and it was changed in the next part of this project (PSM 2) to the JavaScript and C programming language (gcc version). Quick BASIC is simple, easy to learn and construct while JavaScript and C more efficient for further interfacing process between port and hardware circuit. The most important reason is it can be programs in modular forms and its compiler was small enough to fit on a diskette with ample room for programs as well.

In this chapter will cover title and objective, problem statement, project scopes, project workflow and work schedules.

1.2 TITLE AND OBJECTIVES

The main aim of this project is to develop a software and hardware to interface exterior circuit with computer via internet technology. Generally, basic principle of this project is our Personal Computer (PC) being a remote control when we connected to the internet everywhere we go around the world as long as it have internet connection which we can control our electrical appliances at our favorite place. The software and hardware are developed to become simple, easy, fast and user friendly.

Therefore, these project objectives generally can define as below:

1. To apply latest technology in the electric device operation by using the function of global internet.
2. Facilitate operation in implement routine to control electrical appliances by only using computer as the main controller.
3. To provide hands on skill in designs and programming
4. To enhance knowledge in computer interfacing and web-based technologies.
5. To acquire a range of interpersonal skills throughout meetings, interviews, questionnaires, group meetings, conferences and lecturer's supervision during projects development.
6. To be critical in term of evaluating time concepts and material resources throughout the development of the project.

1.3 PROBLEM STATEMENT

1. Normally the process of sending and receiving data through our PC connect with our electrical appliances always slow because of using serial port interface meaning that less data can be send to the application needed in one time period.
 - So we change the serial port to the parallel port interface to increase the performance of sending and receiving data which is connect to the electronic circuit.

2. Insufficient long distance control system using Internet and web technology.
 - Develop a new one long distance control system which is foundation for a theory of web technology by using PHP (Page Hypertext Pre-Processor) language.
 - Develop the application of using QuickBASIC program language as a 'middle ware' between controller (PC) and electronic circuit (devices).

3. Many of our recent control system technology still use the traditional controller (manually).
 - Applying the web server application in digital display using software Apache on Linux environment.

1.4 SCOPES

The scopes of this project are:

1. Design hardware to interface computer with exterior circuit using parallel port.
2. Using JavaScript and C (gcc version) as the programming language to develop software to interface data between computer and exterior circuit.
3. Using PHP language in web technology to develop web and socket programming with basic TCP/IP (Internet).
4. Using the application of web Apache software to execute the program of JavaScript and use the operating system of Linux to match in the data from PHP language.
5. Construct a model to simulate the 'remote control through Internet'.
6. Gain more knowledge of Linux environment.

1.5 PROJECT WORKFLOW

I need to know the fundamental of this project, besides, a good procedure is needed to implement this project from beginning to the end. Here is provided my project workflow:

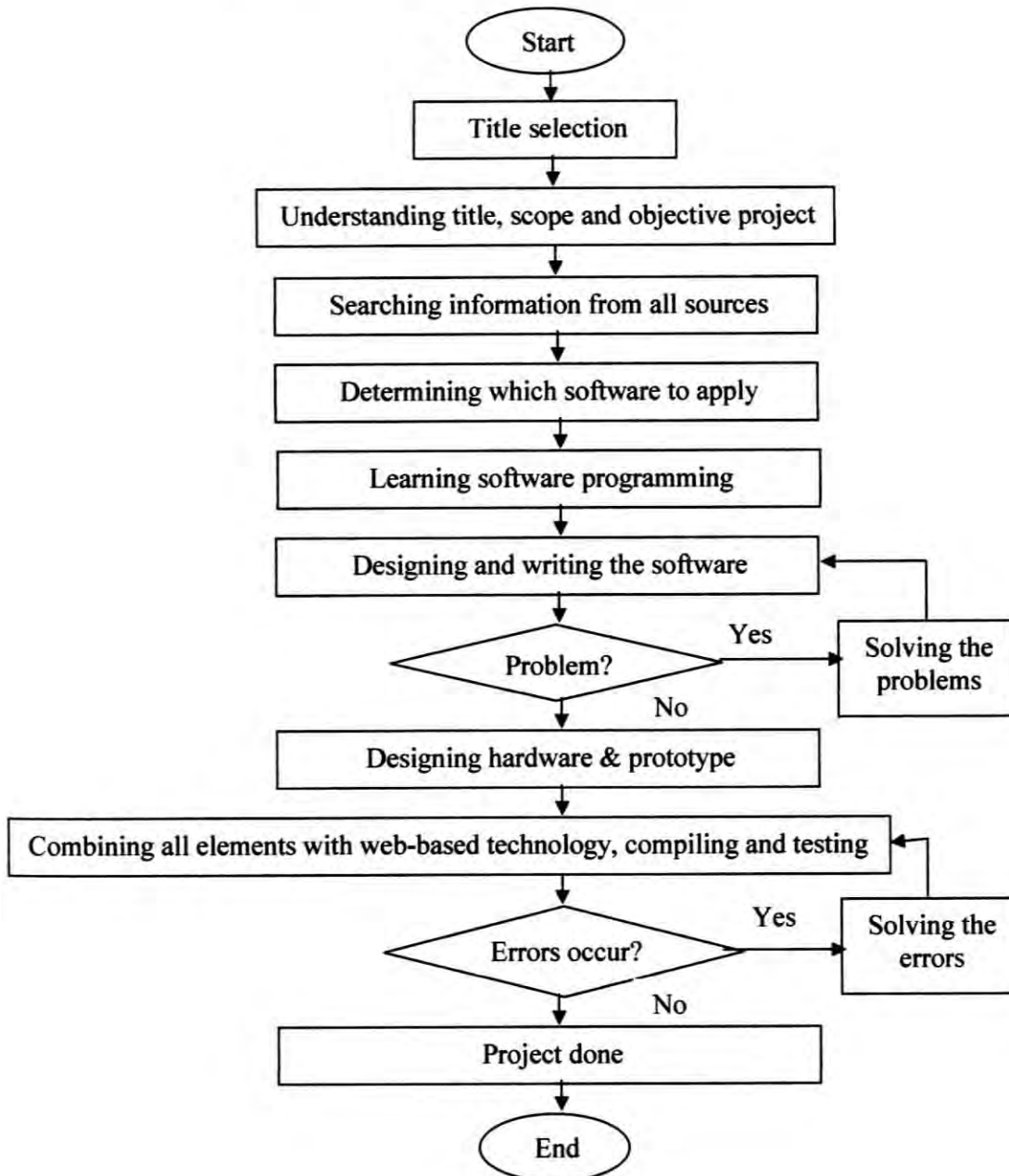


Figure 1.1 : Project Workflow

1.6 WORK SCHEDULES

Month	6	7	8	9	10	11	12	1	2	3	4
Actions	J	J	A	S	O	N	D	J	F	M	A
Survey all titles of PSM '05 and supervisors in charge.											
Title selection											
Analysis and objectives – know the scopes, methods and expected result.											
Gather information + Further reading											
Simple testing on Parallel Port Output + Mastering language											
Writing Report for PSM 1											
Writing Software											
Designing hardware and Prototype											
Joining the entire component with Internet Technology											
Testing in Linux											
Writing Thesis (PSM2), Final Presentation and report submission											Now is here

CHAPTER II

PROJECT BACKGROUND AND LITERATURE REVIEW

2.1 OVERVIEW

Progress in application of computer system for digital control, communication functions and data acquisition has been widespread following the first time real-time minicomputer implementation for process measurement and control. Since the integration of these systems may be defined with respect to the design of the computer interfaces, it make remarkable that such design continue to be based essentially on empirical methods and circuit considerations. However, economic and performance accountability requirements have recently prompted the search for improved interface understanding in pursuit of a more quantitative methodology.

Personal computer is being used in control application and data acquisition along with control and data acquisition board installed in the computer. These boards are inserted into the chassis of computer and allow the computer to be connected to exterior circuit, sensors and other monitoring devices much like a voltmeter is connected by the probes to the voltage source being measured.

The computer provides many attractive features to the control system and data acquisition such as high clock speed, programming flexibility, mass data storage, low cost, high computational power and a level of sophistication those not available to discrete circuits.

The body of knowledge required of today's technician and engineers includes what previously had been the purview of computer along with the body of knowledge traditionally associated with the field electrical and electronics. The electrical technicians today is concern with computer programming, developing software algorithms, interfacing, signal conditioning , as well as operation amplifiers, transistor , electric motors and endless variety of digital integrated circuits and the latest one is combining with the web-based technology (Internet).

Interface is connecting input between hardware and software. Interfacing takes advantages of low cost, demonstrates in a down-to-earth style the range of problems in data acquisition for analysis, can rapidly analyze the results and display the results in the computer, high-speed input/output ports and compatible with high-level languages. In this chapter, it will cover on project background and literature review or theory.

In this chapter, it will cover on project background, literature review and some benefits of this project.

2.2 PROJECT BACKGROUND

Nowadays, in our country, automatic and long distance controller are widely used in traffic control, power industry and also car handling field. However rarely we heard that our electrical appliance in our favorite place like home or office controlled automatically by using computer via Internet technology which means that all information around the world at end of our fingers. Normally, all electrical appliances in a house operate via the manual method by switch on the electrical power supply sockets. But for this project, all these appliances will be operates by using computerize automatic control via internet technology. Computer will be programmed using PHP language program in controlling every electrical appliance that will be used and as replacement human power usage. To implement it, an interface will be use to interfacing between computer and appliances via relay's circuit. Besides, computer will have the function of web-based technology which can access the file data from program language that we used through the server which have IP static using internet browser on Linux environment.

The idea of this project, the users can access their IP static using internet browser. When the users click an "on" button at the websites, the data will be send to server, the server will directly transmit data to the hardware. The data will be processed at the hardware and then convert it to signal that can operate the relay and switch on the electrical appliances.

2.3 LITERATURE REVIEW / TERMINOLOGY / THEORY

Interfacing

First, it is necessary to understand the meaning of the term interfacing. Interfacing is connecting input and output between two or more system. In term of computer, interfacing is the art of connecting computers and peripherals. Interfacing can be implementing via serial port, parallel port, USB port, or even wireless means. For this project, interfacing via parallel port has been chosen and later chapters will be discussed about it in more detail include its advantages.

Programming Language

Basically, we can describe programming language as a series of instructions written by a programmer according to a given set of rules or conventions (“syntax”). High-level programming languages are independent of the device on which the application (or program) will eventually run; low-level languages are specific to each program or platform. There are a great number of programming languages in existence and no one language is suitable for writing all types of programs. The language a programmer uses to create an application will depend on the desired properties of the program. Some programming languages lend themselves to mathematical and analytical functions while others are better suited for creating business or data processing applications. The programming language field is wide and complex, encompassing a large number of disciplines.

Programming language instructions are converted into programs in language specific to a particular machine or operating system (“machine language”) so that the computer can interpret and carry out the instructions.