UNIVERSTI TEKNIKAL MALAYSIA MELAKA

FAKULTI KEJURUTERAAN ELEKTRONIK DAN KEJURUTERAAN KOMPUTER

BORANG PENGESAHAN STATUS LAPORAN

PROJEK SARJANA MUDA II

Tajuk Projek : Smart Switch

Sesi Pengajian : 2009/2010

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SMART SWITCH

MOHD KHAIROL AZIZIN BIN TOING

This report is submitted in partial fulfillment of the requirement for the award of Bachelor of Electronic Engineering (Industrial Electronic) With Honours

Faculty of Electronic and Computer Engineering

Universiti Teknikal Malaysia Melaka

April 2010

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DECLARATION

"I hereby declare that this report is result of my own effort except for works that have been cited clearly in the references."

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"I hereby declare that I have read this report and in my opinion this report is sufficient in terms of scope and quality for the award of Bachelor of Electronic Engineering (Electronic Industrial) with Honours"

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Date : 20/4/10

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DEDICATION

I dedicate to my family for the support, help, cooperation and guidance for this project. I am thankful for their love and never give up on me no matter what happen.

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ACKNOWLEDGEMENTS

Syukur Alhamdulillah, praise be to Allah S.W.T for blessing us all together, to succeed things at the very ease after putting each and every efforts that we have poured. Before I go any further, I would like to thank God with the blessing that help me go through the Projek Sarjana Muda and thesis smoothly.

For first of all, I want to wish a appreciation. I would like to thank to my PSM supervisor, Mr Chairulsyah Bin Abd Wasli as he is the one who set things right specially for this course at this semester and his helps and supports for completion of this project. Also, I would like to take this opportunity to express my deepest gratitude to all my friends who has answer my questionnaire as my survey for this project. I am also to thank for all their kindness and guidance on me throughout my project who I do not mention here.

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ABSTRACT

This project was to develop a system switch control automatically. Purpose of this project conducted would be to generate and develop a system to control lighting usage and exhaust by automatic in toilet. Control process light switch and exhaust produced by using `Programmable Logic Controller (PLC). This software communicated with hardware connected to PLC, for example are such as infrared, ultrasonic and others. Sensor used as key component to receive and sends signals to PLC to control all of this project. FLASH MX software used to show this project in animation. To realize this project a, profoundest study made on sensor, PLC and software. Basic and major study applies in this project including background study, systems development, programmed test field and production.

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ABSTRAK

Projek ini adalah untuk membina sebuah sistem pengawalan suis secara automatik. Tujuan projek ini dijalankan adalah untuk menghasilkan dan membangunkan satu sistem untuk mengawal penggunaan lampu dan ekzos secara automatik di dalam tandas. Proses pengawalan suis lampu dan ekzos dihasilkan dengan mengunakan `Programmable Logic Controller (PLC). Perisian ini berkomunikasi dengan perkakasan yang disambungkan kepadanya, seperti sensor- sensor yang sedia ada. Contohnya adalah seperti infrared, ultrasonic dan lain-lain. Sensor digunakan sebagai komponen utama untuk merima dan menghantar isyarat kepada PLC untuk megawal keseluruhan projek-ini. Perisisan FLASH MX digunakan untuk menunjukkan projek ini dalam bentuk animasi. Untuk merealisasikan projek ini suatu kenyataaan, kajian yang mendalam dilakukan mengenai sensor-sensor, PLC dan perisisan. Kajian yang asas dan utama yang digunakan dalam projek ini termasuk kajian latar belakang, pembangunan sistem,ujian lapangan dan penghasilan program.

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LIST OF ABBREVIATION

UTeM	-	Universiti Teknikal Malaysia Melaka
PLC	-	Programmable Logic Controller
Amp	-	ampere
V	-	voltage
S	-	second
kWh	-	kilo Watt hour
CPU	-	Control Processing Unit
RAM	-	Random Access Memory
ROM	-	Read Only Memory

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CHAPTER I

INTRODUCTION

Chapter I start with the introduction and background of the project. It is followed by objectives, scope of the project and problem statements. Research methodologies and organization of the thesis are presented in the last of the part.

1.1 Introduction

Smart switch is a system that a switch controls the switching of lightning and exhausting in a toilet automatically. The users of the toilet who come in and come out to the toilet are no need to switch on or switch off the lighting on and off automatically.

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Programmable Logic Controller (PLC) is a famous controller system used in controlling process. PLC used control the devices by receiving the input signals, processing the input signals and sending the output signals. This project is to develop a control system that will control the lighting and exhaust system whether to turn on or turn off the lightning and exhaust system.

1.2 Background of Project

The function of this equipment is to switch on/off room lamps and other appliance in the room automatically especially suitable used in the house toilet or public toilet. Currently a toilet use manual switch to control on off all the lamps and exhaust fan. It cause high electric consumer where the light still on while there is no body inside. This project used PLC, double sensors that are infrared sensor and ultra sonic sensor and relay and. Infrared will detect moveable and object in this room with the setting the off timer then these sensors could disable current to light and exhaust fan.

Figure 1.1 : Toilet entrance

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Figure 1.2: Toilet lamps

Figure 1.3: Toilet exhaust

Figure 1, 2, 3 are pictures of a few public toilet. Every toilet averagely have 12 main lamps and exhaust for public toilet. Then, each toilet only has one main switch that controls the switching of lamps and exhaust toilet. Thus, the lamps and exhaust will continuously on if there no one to turn it off. It was a wasting of electricity utilization that was also wasting power, cost, and will increase power needed by consumer. So, as solution, automatic switching needed to solve this problem and then introduce Smart Switch as the solution for this problem.

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PLC act as a main part in this project as it triggers and controls the whole circuit. Process of turning on and turning off will be controlled by PLC. This system is design to detect the toilet user who come in and come out in the toilet. When the user toilet comes in, infrared sensor will detect the user and automatically switch on the lamp and the exhaust. The movement of the user in the toilet will detect of the ultrasonic sensor and keep the lamp and exhaust to on condition. The animation of this system is developed by using software Flash MX.

1.3 Objectives of Project

Following are the objectives set in this project:

- To design a circuit that controls the relay to lamp the lamp and exhaust system
- To develop the model of the control system based on the Programmable Logic Controller (PLC).

1.4 Problem Statement

The usage of the light and exhaust in a toilet are necessary in a toilet system. However, the usage of the lamp and the exhaust are directly twenty four hour per day without turned it off. Thus, their will cost the usage of the electricity by wasting electricity power even there is no user in the toilet. By then, it will cost of the electricity usage and wasted the power and monthly budget electricity billing. The system in the toilets are still conventional where to switch the lamps and exhaust still needed toilet keeper to switch on or switch off the lamps and exhaust which is manually switching. Thus by design smart switch, the lamps and exhaust will turn on turn off automatically to solve the problem and save more power of electricity.

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1.5 Scopes of Work

The system designed to detect the user come in and come out to switch on and switch off the lamp and exhaust. The lamps and the exhaust switching used by sensor used in the toilet within the set up of sensors in the toilet. The used of sensor of infrared will detect the user come in and come out into toilet. Then, ultrasonic sensor used to detect the movement of the user in the toilet to keep the lamp and exhaust on or off. This project will involve the research on the temperature controller with PLC. PLC will be the main part of the project as it controls the switching process in the toilet. FLASH software also will be used to develop the animation for smart switch system.

1.6 Expected Outcome

The expected outcome for this project is that the automatic switch controller is build. This device use PLC as controller to the output. The animation of the system is build.

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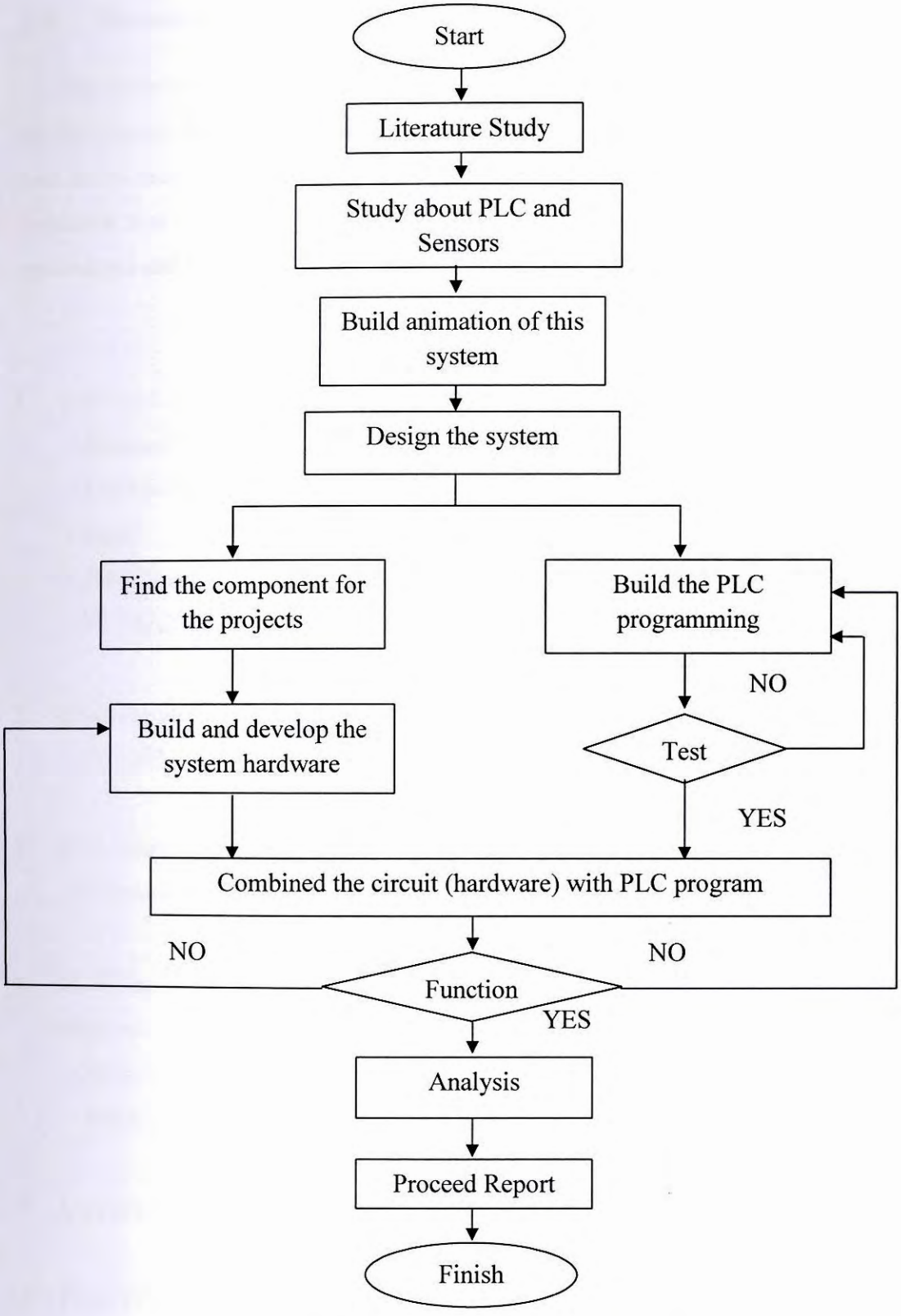

Figure 1.4 Flow Chart of Methodology

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1.7 Methodologies

The smart switch builds by using PLC as a main component. PLC used to control the all the part in this project. PLC receives the signals from sensors like infrared sensors and sends output signals to control the output of the project. With this system of the lightning and exhausting system can be controlled by the output of the PLC. The procedures and methods used to achieve the project objectives are;

1. Literature review and background study
   - Infrared Sensor
   - Ultrasonic sensor
   - Relay
   - Programmable Logic Controller (PLC)
   - FLASH Software

2. Studying and develop animation of the project with software.
   - FLASH Software used to develop the animation

3. Build switch sensor circuit in order to send the input signals to the PLC.
   - Ultrasonic sensor circuit builds

4. Studying and handling the PLC to control the whole project to maintained the water temperature.
   - Studying PLC controller system.
   - Studying and develop PLC program.

5. Combine the hardware components with software system which is PLC.

6. Field Testing

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