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**HOME CONTROL USING PLC AND LABVIEW**

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**This report is submitted in partial fulfillment of the requirements for the award of  
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UNIVERSITI TEKNIKAL MALAYSIA MELAKA  
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Specially dedicated to my father and mother...

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## ABSTRAK

Projek ini berkaitan dengan mereka bentuk rumah kawalan yang dapat dikawal dengan menggunakan Programmable Logic Controller (PLC) di bilik tidur utama. Tujuan projek ini adalah untuk memberikan lebih kesenangan dan kemudahan kepada pemilik rumah di mana mereka dapat memantau dan mengawal perkakas elektrik dari sebuah bilik kawalan. Projek ini mengabungkan rekaan yang melibatkan perkakasan dan perisian menggunakan program PLC. Dalam projek ini, PLC telah digunakan sebagai pengawal utama dan GRAFCET pula telah digunakan sebagai perisian yang dapat menunjukkan aliran proses dengan lebih jelas sebelum ditukar ke program PLC iaitu gambarajah tetangga. Selain itu, Labview juga telah digunakan di dalam projek ini sebagai alat penunjuk untuk menunjukkan status setiap perkakas elektrik. Sumbangan besar dalam projek ini ialah aplikasi PLC di mana ianya merupakan sistem kawalan yang berkemampuan menjadi pengawal utama kepada semua peralatan elektrik.



## ABSTRACT

This project is concerned with designing the home control that can be controlled using Programmable Logic Controller (PLC) at master bed room. The purpose of this project is to give more benefit to house owner where they can monitor and control all electrical devices from one control room. The project involves designing the combination hardware and software using PLC. PLC is used in this project as a main controller and the GRAFCET is used as a design tool to show the process flow clearly before convert to PLC language, which is ladder diagram. Besides, to monitor all electrical equipment status, Labview is used as an indicator. The major contribution of this project is in application of PLC which is able to control the system. It has a function as a master controller to all electrical equipment.

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## LIST OF ABBREVIATION

PLC	-	Programmable Logic Circuit
GRAFSET	-	Standard graphical language for expressing the combinational and sequential control logic
LabVIEW	-	Laboratory Virtual Instrumentation Engineering Workbench
NEMA	-	National Electrical Manufacturing Association
CPU	-	Central Processing Unit
I/O	-	Input and output
ac	-	Alternating current
dc	-	Direct current
NTC	-	Negative temperature coefficient
PTC	-	Positive temperature coefficient
PCB	-	Printed Circuit Board
PC	-	Personal Computer
VI	-	Virtual instruments
LED	-	Light Emitting Diode
PSM	-	Projek Sarjana Muda
LDR	-	Light Dependent Resistors

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## **CHAPTER I**

### **INTRODUCTION**

#### **1.1 Introduction of the Project**

This project deals with controlling home appliances and security system through the Programmable Logic Controller (PLC). Based on Figure 1.1, PLC is a programmable controller which has a processor unit, memory and input output terminal. These components work together to control machine and process. The GRAFCET, the design tool for PLC was chosen since it gives more structure approach compared with the conventional way. In this application, the PLC is used to control a list of home appliances and security system from one control room. The Labview will be used as a front panel at particular control room to show how the system works. As the final outcome, the model of the system will be developed.

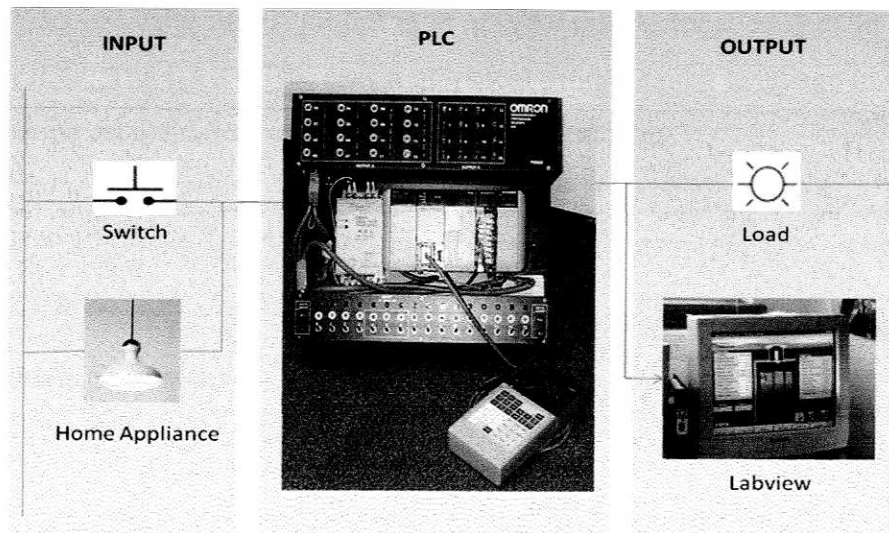


Figure 1.1: Block Diagram Of PLC System

## 1.2 Objective

This project is proposedly designed to give more convenience for house owner especially for those have a big house and those have a small childrens. It is because, the main objective of this project is to controlled remotely the electrical equipment and security system from one control room. All equipment will be controlled by using PLC system whereas the function is to turn on or off the dedicated electrical equipment.

In further, the objective of this project is to design the home control system program using the GRAFCET that clearly represents the sequential control logic relative to the specified process control application before develop.

The final objective of this project is to monitor the electrical equipment status using LABVIEW. The LABVIEW uses a graphical programming language to create programs relying on graphics to describe programming actions.

### **1.3 Problem Statement**

Nowadays, house is not merely developed as elementary facility, but it is developing to give more comfortable place to people and almost each house has the electrical supply. For the larger house, it is so difficult to control all electrical equipment without one centralized unit especially those have double-storey house . In this situation, house owner have to spent more energy to control the electrical equipment in the house. For example, people at master bedroom at second floor should have to go to the kitchen in first floor to switch off the light if they are forgotten. Another example, for people those have children they normally play around with electrical appliances such as light, fan or television volume at another room. In this case, the master bedroom in the house is important to control or monitor all electrical usage.

To solve the problem, one system is design to communicate over the indicator at master bedroom. The system will send the signal to the indicator to show the equipment status and at the same time owner also can control all electrical usage either to switch it on or off.

## 1.4 Scopes Of Works

The scope of this project is to develop electrical equipment controlled from master bedroom. The master bedroom will control all electrical equipment at both floor as shown in Figure 1.2 and 1.3.



Figure 1.2: First Floor

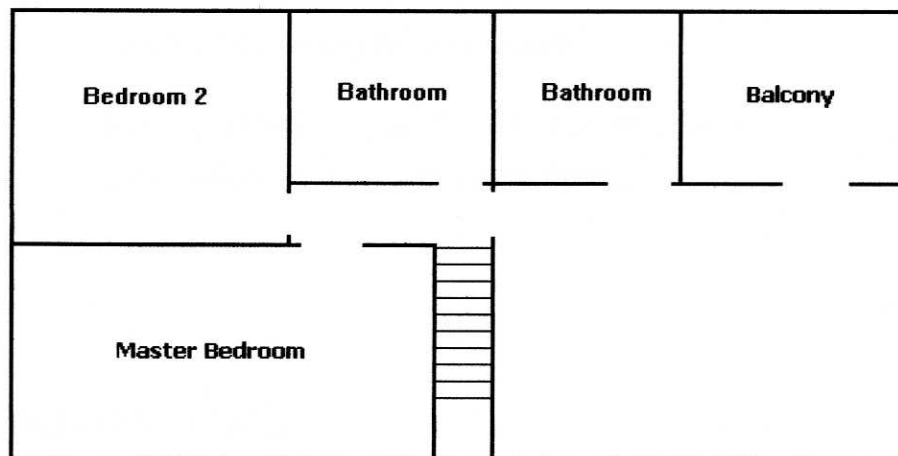


Figure 1.3: Second Floor

In order to control that equipment, the programmed of the PLC will be implemented using CX-Programmer as the programming tool has to be developed. The PLC system is used to control to ON or OFF the electrical equipment such as light, fan, televisyen and security system. Besides that, the electrical equipment can function in two way either automatically, based on sensor detection or manually, depend on switch on or off.

The electrical status should be display using by LABVIEW software which to inform either it is in use or not. From this situation the owner know that equipment must turn on or off. To make the whole thing operate, the list below have been created to perform the task:

- i. Construct the GRAFCET using AUTOMGEN software to comunicate with the system
- ii. Develop a ladder diagram base on GRAFCET using CX-Programmer to make sure the computer can communicate with the PLC.
- iii. Construct the circuit of the PLC input output
- iv. Construct the wiring for home model.
- v. Develop a block diagram that contain terminals corresponding to front panel indicators using Labview software.

## **1.5 Project Methodology**

Methodology is important part of the whole project because it shows out on how the project's activity develops. So in this project, it is divided in two parts, which is hardware development and software development. In this section, the