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ELECTRICAL ENGINEERING DEPARTMENT

SMART DUSTBIN

DEE6092 – PROJECT 2

Prepared by :

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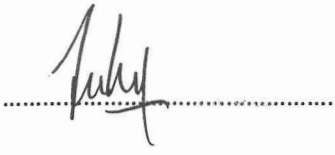
DECLARATION

We hereby declare that this is the result of our own investigations, except where otherwise stated. We also declare that is has not been previously or concurrently submitted as a whole for any other projects at SeberangPerai Polytechnic.

LEONG KHAI SOON (10DEP14F1044)



Date:7 OKTOBER 2016

APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion, it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as Final Year Project report as partial fulfillment for a diploma of Electronic Engineering (Communication).

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[*PUAN ERNIZA BT ZAILAN*]

Supervisor

ACKNOWLEDGEMENT

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Other than that, I would like to express gratitude towards my parents, and my colleague for kind encouragement, co-operation and their willingness to help me out which help better in completion of this project.

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POLITEKNIK MALAYSIA
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PROJECT 2

FINAL REPORT

SMART DUSTBIN

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION OF PROJECT

Smart dustbin is a device that can open the dustbin without using your hand to open the dustbin cover. The idea of the project comes with the thought of creating something to inspire people to throw their rubbish or waste responsibly. We are creating a product that will change the mindset of every individual who is throwing the rubbish in the city.

1.2 OBJECTIVES

There are three objectives to be achieved in this project such as

- Make environment more clean
- Easy to use
- Easy treatment of rubbish

The objective of this project is to want to make our environment more clean. Nowadays, many people like to throw their rubbish anywhere so that our world is getting dirty so we create this device is hope our public can throw their rubbish to the dustbin. Mostly people like to throw their rubbish anywhere the most important reason is no dustbin around them. The second reason is the dustbin cover in too dirty that they afraid to get their hands dirty so now we create a smart dustbin by using a button to open the dustbin cover.

1.3PROBLEM STATEMENT

For beginning , we are find out to how to make the smart dustbin. So we find the example of smart dustbin and see the process in youtube to make it as our reference.

This is the problem that why we create the smart dustbin:

- People lazy to throw the rubbish
- Many rubbish everywhere
- Smelly environment
- Trash disposal problem

I encountered a lot of problem when doing smart dustbin and I ask my friend and my supervisor to give me some opinion for solving those problem.

1.4 RESEARCH QUESTION OF PROJECT

In the production process there will be many problem:

- Use PCB Wizard to design PCB layout
- Etching problem
- Find the coding
- Test the circuit

1.5SCOPE AND LIMITATION OF PROJECT

Scope .

- Smart dustbin can help some people that disabilities to operate the dustbin easily.
- Smart dustbin can be used in many area such as: school , house ,roadside .

Limitation

- Public will feel freshness and like to try the product so that public will throw the rubbish or trash into the smart dustbin.
- Smart dustbin can operate easily.

1.6PROJECT IMPORTANCE AND IMPACT

Inside this smart dustbin we placed an Arduino and a push button inside our circuit. If you want to open the dustbin cover you can press the push button then the button will send the signal to our Arduino and our Arduino will run the coding that we have import. This smart dustbin will help the cleaner work easily, they no need always bend over their waist to open the dustbin cover only for throwing one or two rubbish.

When using at home, our smart dustbin also very useful. At home child will feel freshness and they like to try something that they are interests so they will pick up the rubbish or waste and throw into the smart dustbin.

CHAPTER 2

LITERATURE RESEARCH

2.1 Background Of Project

Smart dustbin is a very important device in our world. Nowadays, our earth is getting dirty and this will cause environment pollution the main reason of environment pollution is people love to throw their rubbish on the floor , river or the roadside just because of the dustbin is not around them and some even the dustbin is on the side because they are lazy to open the cover so they put the rubbish beside the dustbin just they the dustbin cover is dirty for them to touch it. So I create this smart dustbin is wan to help our world become more clean and lets public feel freshness and they will throw their trash or rubbish into the smart dustbin.This project can improve more better in the near future. I hope this will help our cleaning staff or housewife to complete their jobs more quickly and easy to operate for some disabled.

2.1.1 Table Of Component

- PUSH BUTTON
- RESISTOR
- IC L293D
- DC MOTOR

2.2 Components On Board

In this topic, we will explain further about the components we used to develop the project.

2.2.1 IC L293D

L293D is designed to provide bidirectional current up to 600 mA, and the voltages from 4.5 v to 36 v.In this L293D, there are two enable pins (pin 1 & pin 9) for activating the IC.

When the ENABLE pin 1 is high, the left part of IC will work, if it is low it will not work. Same condition applies to ENABLE pin 9 in which the right part of IC will work and there are 4 input pins and 4 output pins in this IC. The 4 input pins are 2, 7, 10 & 15.

Pin 2 & 7 are in the left hand side and pin 10 & 15 are in the right hand side. Left side pins will regulate the motor connected across the left motor, and the right side pins will regulate the motor connected across the right motor and the 4 output pins are 3, 6, 11 & 14, these output pins are connected to the motors respectively.

The pins 4, 5, 12 & 13 are ground pins. The pin 8 will go to Vcc, which will be supplied to the motor, and pin 16 will go to Vss that is supplied to the IC.

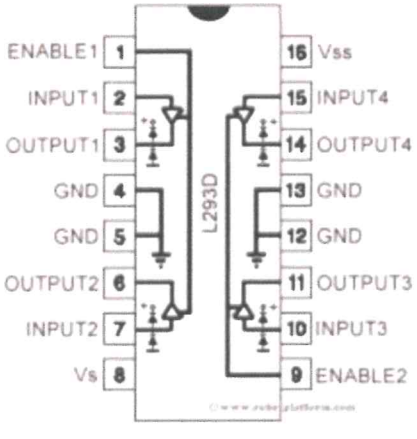


Figure 2.2.1: IC L293D

2.2.2 RESISTOR

A resistor is an electrical component that limits or regulates the flow of electrical current in an electronic circuit. It can also be used to provide a specific voltage for an active device such as a transistor. Resistors act to reduce current flow, and, at the same time, act to lower voltage levels within circuits.

In electronic circuits, resistors are used to limit current flow, to adjust signal levels, bias active elements, and terminate transmission lines among other uses. Resistors are common elements of electrical networks and electronic circuits and are ubiquitous in electronic equipment. Practical resistors as discrete components can be composed of various compounds and forms. Resistors are also implemented within integrated circuits.

All other factors being equal, in a direct-current (DC) circuit, the current through a resistor is inversely proportional to its resistance and directly proportional to the voltage across it. This is the well-known Ohm's Law. In alternating-current (AC) circuits, this rule also applies as long as the resistor does not contain inductance or capacitance.

Resistors can be fabricated in a variety of ways. The most common type in electronic devices and systems is the carbon-composition resistor. Fine granulated carbon is mixed with clay and hardened. The resistance depends on the proportion of carbon to clay which is the higher this ratio, the lower the resistance.

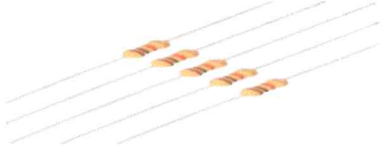


Figure 2.2.2 Resistor

2.2.3 DC MOTOR

A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor. Most types produce rotary motion; a linear motor directly produces force and motion in a straight line.

DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

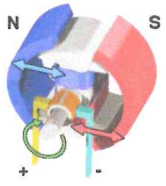


Figure2.2.3 DC MOTOR

2.2.4 PUSH BUTTON

A push button or simply button is a simple switch mechanism for controlling some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal.The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed or pushed. Buttons are most often biased switches, though even many un-biased buttons require a spring to return to their un-pushed state.

Figure 2.2.4 Push button

2.2.5 ARDUINO

Segmenting code into functions allows a programmer to create modular pieces of code that perform a defined task and then return to the area of code from which the function was "called". The typical case for creating a function is when one needs to perform the same action multiple times in a program.

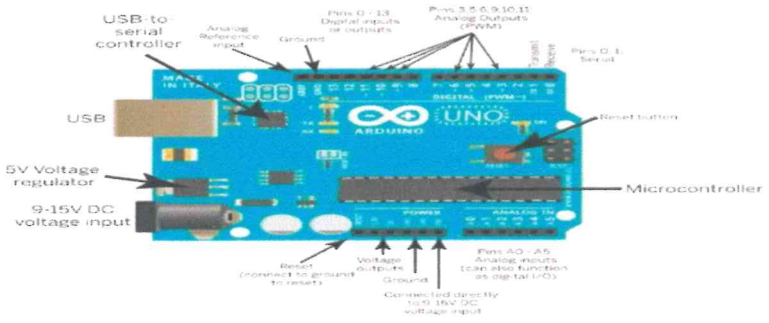


Figure 2.2.5 Arduino

2.2.6 POWER SUPPLY

That the battery used in this project. The whole system is powered up by a battery which is able to supply $9V$. It is essential for the current to be high enough to power up all the components. Otherwise, the sensors will not be able to operate well as the output signals of the sensors are not accurate.

Figure 2.2.6 battery 9v

2.2.7 Jumper

A 'jumper' might be where temporarily connect two conductors which aren't usually connected, for the purposes of working around a fault.

Figure 2.11 Jumper

2.3 SUMMARY

In this chapter, we learn about the component that we use in our project such as: Arduino , DC Motor, jumper ,push button and etc. This allow us to better understand all the component and the function of the component.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

Methodology can be the 'analysis of the principles of methods, rules, and postulates employed by a discipline', 'the systematic study of methods that are, can be, or have been applied within a discipline' or 'a particular procedure or set of procedures.

Methodology includes a philosophically coherent collection of theories, concepts or ideas as they relate to a particular discipline or field of inquiry. Methodology refers to more than a simple set of methods, rather it refers to the rationale and the philosophical assumptions that underlie a particular study relative to the scientific method. This is why scholarly literature often includes a section on the methodology of the researchers.

Each step of project is a process to complete the project. Every step must be followed one by one and must be done carefully. If some error occurs it can make.

A project probably could not operate or do not look neat and perfect. Before the project finish, various processes need to be done according to proper procedures to ensure that projects do not have any problems. Among the measures the works done in preparing this project are:

- Process of designing circuit.
- Circuit board trace
- Soldering process in circuit board.

3.2 Discussion And Selection Of Projects

Our group has been in discussed and has found several reasons why we chose this project:

- Before starting a project, the discussion is very important to get the result in the selection of projects
- Selection made must be agreed by all members of the group
- The idea is very important to develop and facilitate a project
- Projects selected cannot be changed and all the members of the group must develop ideas to improve the quality and capacity of the project

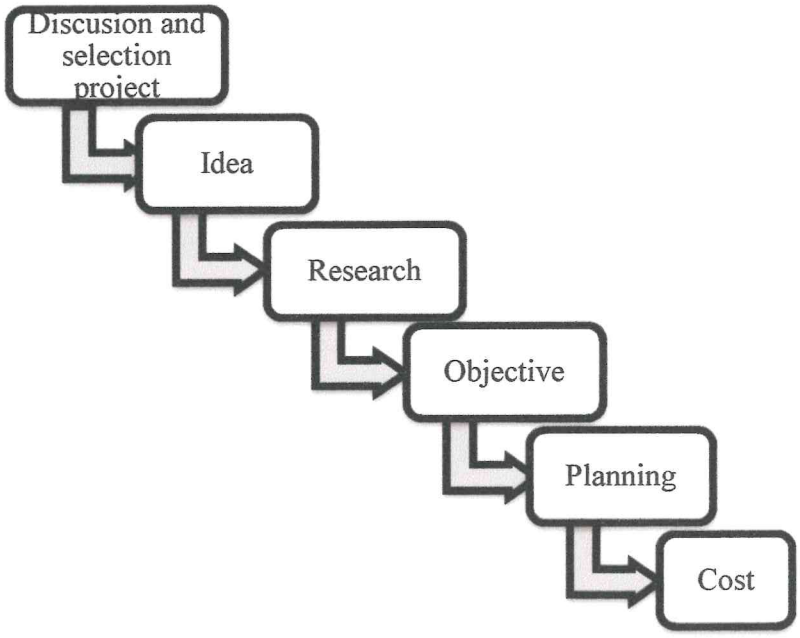


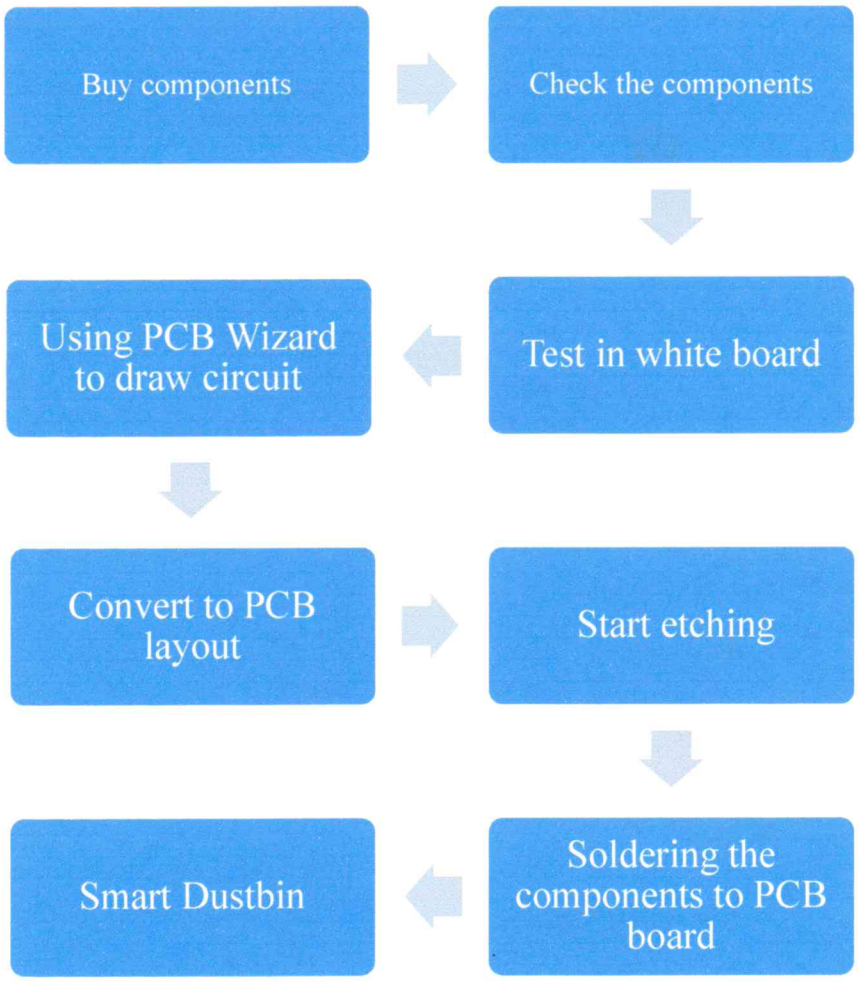
Figure 3.2 Flowchart of Project Selection

3.3 Circuit Drawing

Circuit drawing is very important because in engineering projects can decipher whether a project is successful or not successful run.

- Drawing circuits play an important role in the percentage of failure and success of a project
- Circuit must be drawn correctly and arrangement of components in the circuit drawings also required updates as it is essential to reduce the percentage of failure of a project.
- Good painting result can produce high-quality projects that can give satisfaction to the user

3.4 Production Project

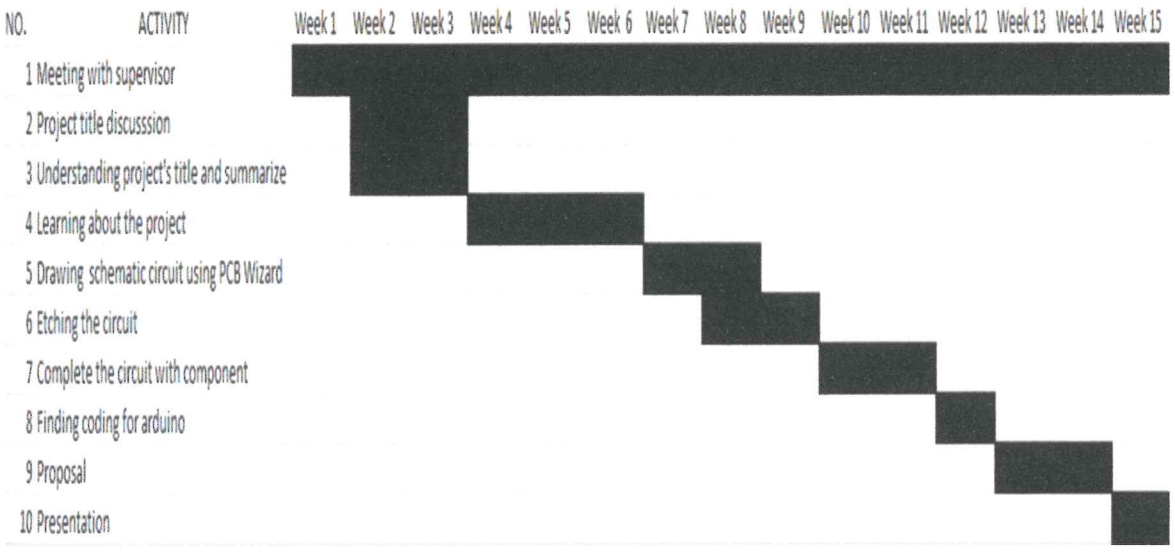


3.5 Milestone Table

Other than that, we will explain about planning table. According to planning job table topic, we will show our Gantt chart during development this project. Gantt chart also known as milestone table that is use to show time start and end time for task 1 project. The duration of each job or task can be display in Gantt chart. It is a popular type of bar chart that illustrates a project schedule. Terminal elements and summary elements comprise the work breakdown structure project.

Gantt chart have become a common technique for representing the phases and activities of a project work breakdown structure, so they can be understood by a wide audience.

3.5.1 Gantt Chart of Project Flow



3.6 Project Estimated Cost

Table 3.6.1 List Of Component

COMPONENT	PRICE PER UNIT (RM)	QUANTITY	PRICE (RM)
IC L293D	4.50	1	4.50
Resistor	0.05	1	0.05
Arduino	28.00	1	28.00
DC Motor	25.50	1	25.50
Jumper	0.70	2(meter)	1.40
Push button switch	0.42	1	0.42
Battery	9.90	1	9.90
Board	23.00	1	23.00
		Total (RM)	92.77

3.7 PCB Preparation

3.7.1 Schematic Circuit Design Using Software

- Use computer software to make the schematic design of the project, for example of the schematic design software is Proteus PCB, PCB Wizard and other.

3.7.2 Ultra Violet (UV) Transfer Process

- It help transfers your layout design to a positive-resist PCB by exposing UV light to the sensitized PCB with the printout as a mask. For this step you will need: a printed circuit board, scissors, tape, a UV bulb and thin plate glass or exposure unit. This step takes 5-10 minutes.

Figure3.6.2 :UV Light process

3.7.3 Develop Process

- In this step, the exposed photoresist is removed chemically using developer, leaving a positive of your layout in photoresist on copper.

Figure 3.6.3 Develop material for clams

3.7.4 Etching Process

- In this step, the board is placed in an etcher, which is a machine that washes warm ferric chloride (or another etchant) over the board, eating away any exposed copper. For this step you will need to make sure the etchant is warm enough to use. This step takes 9-10minutes.

Figure 3.6.4 Etching process

3.7.5 Drilling process

- In this step, the holes on the PCB are drilled out. This step takes 3-10 minutes, depending on number of holes in PCB.

Figure 3.5 Drill equipment

3.7.6 PCB WIZARD

PCB Wizard is a powerful package for designing single-sided and double-sided

CHAPTER 4
TESTING AND RESULT

4.1 Introduction

Circuit testing is to ensure that components are not damaged and knowing the correct polarity before installing. Each component have its own way of knowing the correct value and polarity. Circuit testing is also to ensure that the current flows in accordance with the specified count.

4.2 Test Project

The process of testing the project is done, after all the components have been installed completely. The process of testing is done in the PCB Board.

All electronic components used in the circuit is tested first to ensure that it can function properly and thoroughly. For this project we undertake, some testing has been done to make sure completeness of the component.

4.2.1 Testing with Digital Multimeter

Multimeter was also used to test a variety of components such as resistors, capacitors, transistor and so on. It can be used to test whether an NPN transistor or PNP. Meter range is also used for :

a) Identify broken or defective circuit
b) Measure the resistance (in Ohm)
c) Measure the current (in Amperes)
d) Measure the voltage (in Volts)
e) Test the continuity of the circuit / fuse