FORKLIFT ROBOT

MOHAMAD SYAHMIZAT BIN ROSLI
(10DTK15F1118)
MUHAMMAD IQMAL BIN ABDUL RAHIM
(10DTK15F1093)
DANIAL MIRZA BIN AMINUDDIN
(10DTK15F1042)

CONTENT

ABSTARCT

Proposal project submitted in fulfillment of the requirement for the award of the Diploma of Electrical Engineering (Computer) Department of Electrical Engineering Seberang Perai Polytechnic (PSP).

JUNE 2017

PROJECT REPORT COMFIRMATION

I hereby declare that the work in this report is my own except for quotations and summaries which have been duly acknowledged.
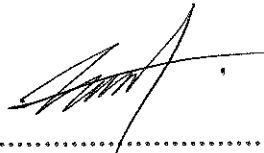
By

....
(Mohamad Syahmizat Bin Rosli)
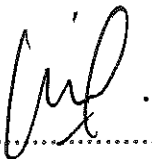
....
(Danial Mirza Bin Aminuddin)

....
(Muhammad Iqmal bin Abdul Rahim)

Recommanded by Supervisor :

....
(Encik Mohd Kamil bin Mohd Zahari)

Date : 3 December 2017

Dedicated to,

Thanks to Allah,

For give me a good health and strength while making this report.

My beloved father and mother

My beloved relatives,

My siblings,

Thank you for your support and pray.

The person who has been very understanding and helpful,

Encik Mohamad Kamil Bin Zahari

For the support and guidance. Hope that I always be remembered.

My unforgettable friends,

My housemate, my coursemate and all DTK students intake June 2017,

Our struggle not yet ends.

Finally, friends that always together during this third years study,

Hopefully achieved what we aspired.

APPRECIATION

In preparing this report, I dealt with many people and they have a great contribution towards my understanding and thoughts.

First and foremost, I would like to acknowledge and extend my gratitude to my main supervisor, Encik Kamil Bin Zahari, for the encouragement, guidance and enthusiasm given throughout the completion of this project. In particular, I also wish to express my sincere appreciation to JKE lecturer for willing to spend precious time to give some ideas and suggestion towards this project. This report would not have been the same as presented here without continued support and interest from them.

My appreciation also goes to our family who has been so tolerant and supports us all these years. Thanks for their encouragement, love and emotional supports that they had given to us.

Furthermore, our great appreciation dedicated to our friend and those who involve directly or indirectly with this project. Their views, tips, support, and assistance in various conditions are useful indeed.

CHAPTER 1

INTRODUCTION

This study explores how robotics is being used, and could be used in the future, in the field of construction. Robotics as a whole is a synchronous combination of mechanical, electrical, and software engineering. It is a field that aims to better the lives of humans in tasks that are dangerous, dirty, or demanding. Construction is the process of creating or renovating a building or an infrastructure facility. Due to the evolving field of robotics, the goal of this project is to find out how robotics can be implemented into construction tasks and to identify as many robotics technologies as possible that can have some application in construction, while also determining if any of these potential technologies can be integrated in the near future.

1.1 Project Background

The purpose of this project is to design and implement a controlled forklift robot via Bluetooth connection by using android smartphone. Forklift robot was designed to make daily process become easier and save people energy rather than lifting manually by themselves. The main objective of this project is to design and implement a forklift robot prototype by using Adriano Uno, L293D Motor Driver, DC Motors, Batteries and Bluetooth Module to achieve the goal of this project.

1.2 Objective Of This Project

1. To design a small forklift robot which is portable, small size, lightweight and controlled operation

2. To build the mechanical part of the forklift robot

3. The testing of the robot showed that it can achieved almost all the functionalities

1.3 Project Scope:

1. To developed small forklift robot is operated using battery.

2. To developed small and light forklift robot is operated on the floor without any obstacles and can be used in any kind of situation.

3. Select the suitable material to develop the robot

4. The developing of programming is necessary to develop a mechanism of the robot.

CHAPTER 2

LITERATURE REVIEW

For this chapter 2 which is literature research we were tell about the project that we make. For the students who takes a project 02 we need to build a Forklift robot. We can choose to control our Forklift robot project using remote control , joystick or Bluetooth module. For our Forklift robot project, we choose to control our Forklift robot it using Bluetooth module. The size that given to build out Mopping Robot is general. The components and equipment that that is needed to build Forklift robot were Arduino Uno. Bluetooth Module (HC-05), jumper wire, breadboard, L293D and motor driver. After we find the coding for our Forklift robot we upload the coding to the Arduino using the cable that is given when we buy our component with our supervisor. The software that we used to make a Forklift robot were Proteus 8 and Arduino software. In this chapter 2 , we will explain the detail about the Forklift robot in theory. We also do the etching and soldering process to complete our Forklift robot.

2.1 Introduction

This chapter will discuss in details on the components and instruments used for this project in general. Besides that, there are couple more of past related project or paper work that is related to this project. It is a field that aims to better the lives of humans in tasks that are dangerous, dirty, or demanding. Construction is the process of creating or

renovating a building or an infrastructure facility. Due to the evolving field of robotics, the goal of this project is to find out how robotics can be implemented into construction tasks and to identify as many robotics technologies as possible that can have some application in construction, while also determining if any of these potential technologies can be integrated in the near future

2.2   Component of projects

This is the proposed Forklift system of material as on planned.

COMPONENT OF FORKLIFT ROBOT	
DESCRIPTION	QUANTITY
BOARD 1	
Arduino	1
IC L293D	1
Jumper Wire	20
Tyre	4
Serial Port Bluetooth Module : HC06	1
Motor driver	2
Diode	1
Relay(5 volt)	1
Motor dc	1
Battery 9v	3

Arduino board

Arduino is the open source software used to create the language programming in order to run the system.

Figure 2.0 Arduino Board

IC l293d

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction.

Figure 2.1 IC 1293d

Capacitor

Capacitor function is to store the electrical energy and give this energy again to the circuit when necessary. It charges and discharges the electric charge stored in it.

Figure 2.3 Capacitor

Jumper Wire

A jumper wire is a conducting wire used to transfer electrical signals between two points in a circuit. The wires can either be used to modify circuits or to diagnose problems within a circuit.

Figure 2.4 Jumper Wire

Motor Servo

The function of the servo is to receive a control signal that represents a desired output position of the servo shaft, and apply DC motor until its shaft turns to that position.

Tyre

Its thick rubber layer, which is attached to the part of the tyre that meets the road can withstand exterior damage or wear.

Figure 2.5 Tyre

Serial Port Bluetooth Module : HC06

Serial port bluetooth, Drop-in replacement for wired serial connections, transparent usage. You can use it simply for a serial port replacement to establish connection between MCU and GPS, PC to your embedded project.

Figure 2.6 Serial Port Bluetooth

Module : HC0

Diode

Diode is an electronic component made of semiconductor materials. This component has two sources of external connection for use on a circuit wiring. Diodes can be found in all shapes and sizes. Its characteristics is the diode current flows in one direction only, from the cathode to the anode. The diode has the anode and cathode electrodes. Voltage tolerances must also be known. Diodes can be identified by its label.

Figure 2.7 Diode

CHAPTER 3

METHODOLOGY

3.1   Introduction

This part shows the basic flow of methodology and approach for the project. The project is divided into two parts which are hardware and software. For the software implementation, it involves writing code and programming the Arduino . Meanwhile, hardware implementation involves designing the circuit of the project and PCB development. After both parts was complete the next was the testing and debugging proces. Each part of the project will be discussed in details in this chapter.

3.2 Research and Analysis Project

Research is important to ensure the project that is yet to progress can have a good start so that it would not cause any problem during the project development. So, the vital information such as the circuit, the component usage, the commercial needs and much are indeed important . It is as the circuit, ensure the can understand more on how important is the project. The source can be obtained from lectures, books and also internet.

3.3 Flow Chart

Here is the sequence of process that need to be follow all the step to make
project.

```
┌─────────────────────────┐
│      Title Selection     │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│      Design Circuit      │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│ Printing Circuit On Tracing │
│           Paper          │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│            UV            │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│         Etching          │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│        Drill PCB         │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│    Soldering Component   │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│      Testing Circuit     │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│       Start Report       │
└─────────────────────────┘
            ↓
┌─────────────────────────┐
│       Finish Report      │
└─────────────────────────┘
```
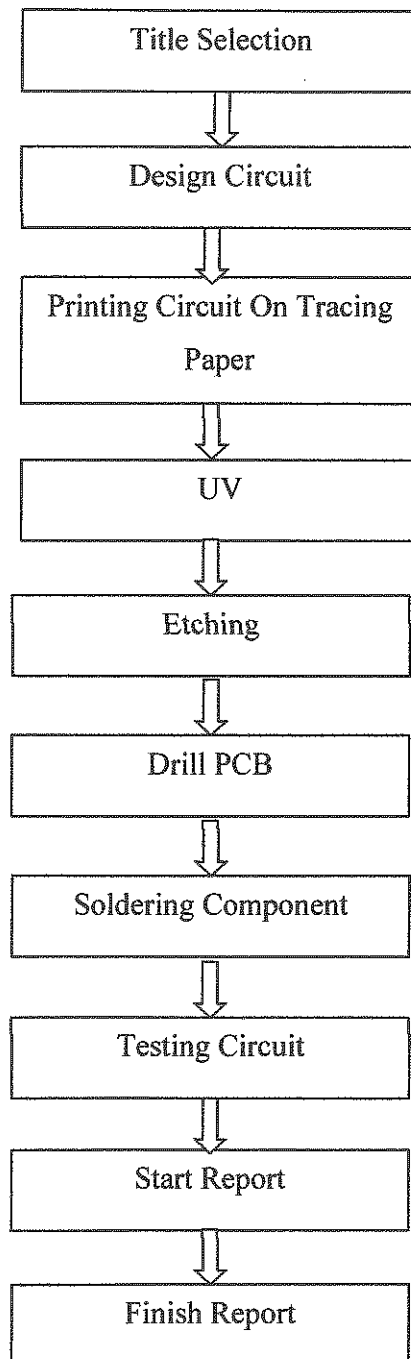
3.4 Week Planning

Weeks	Planning
W 1	Registration Student
W 2-5	Planning
W 4-7	Project Planning
W 7-9	Buy Component
W 8-10	Etching
W 11-12	Test Circuit
W 13-14	Completing The Project
W 13-14	Report
W 15	Presentation

Week Planning

3.5 Gantt Chart

Task	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1. Research	■	■	■	■												
2. Consultation & approval					■											
3. Project planning						■										
4. Implementation							■	■	■							
5. Report												■				
6. Troubleshooting													■	■		
7. Presentation															■	

Table 3.5 Gantt chart Projects

16

3.6   Equipment

Multimeter

Troubleshooting was an important step that need to be done before we could run our projects successfully. If we were discovered the damage of the components, we have to change the components, we need a multimeter so that the process of troubleshooting will be more easier.

Step of using the multimeter:

i.   Reading the value in the multimeter at a correct position that is 90 degree.

ii.   Make sure that the range have been used used were suitable to the experiment that we were doing.

iii.   Compared the experiment value with the theory value, ex. Resistor colour code.

iv.   The multimeter should be putted in 90 degree from our view level to get an exactly result.

Soldering Iron

Soldering iron was an important tools that need to be used everytime we make soldering process. Soldering iron was generated by 240 Vac and it could be found in different type depanding on it's power (Watt).

Figure 3.1 Soldering Iron

Solder Lead

When we do the soldering process, on of the most important items that we needs to use was a solder lead. The solder leads was made by an alloy and plumbum. It was used to joined the end of the wire and the component legs to the circuit board. Solder leads has been graded according to the mixture between the lead and plumbum. It could be found in different type of grade such as 60/40, 50/50, and 40/60. However, the grade that we were used recently was 60/40 which means that it was consist of 60% of lead and 40% of plumbum. This type of the leads could be melt in low temperature and its was made in a different size of diameter like 0.8mm and 1mm.

Lead Remover

This tool was used to sucked or take off the solder lead from the circuit board. It was very important especially when we want to detached an abundant or damage lead from the circuit board. Besides that, it could also let us to removed to components from one place to another easily.

Figure 3.3 Lead Remover

Flux

Flux was a metarial which is used to detached an oxide layer from the soldering point. This layer would exist when the legs of the components and the current track have been heated.

Figure 3.2 Flux

Screw Driver

i)   Flat Nose Screw Driver

- This type of screw driver have a flat nose which it is look like a negative sign. It used to loosen or tightened a flat head screw.

ii)   Philips Screw Driver

- This type of a screw driver was a bit different from the Flat Nose Driver which it's nose was look like an X sign. It is used to loosened of tightened an X head screw.

Figure 3.4 Philip screw driver

i)   Plier

It is used for an ordinary worlk such as holding,cutting and twisting an electric cable. It has tooths on both of it's nose so that it could clutched any round sticks.

Figure 3.5 Plier

ii)   Side Cutter Plier

It is used to cutted cables or even the components legs. It has a short and sharp bone.

Figure 3.6 Side Cutter plier