



FINAL REPORT

POLITEKNIK SEBERANG PERAI

**DIPLOMA ELECTRONIC ENGINEERING (COMPUTER)
DEC 2016**

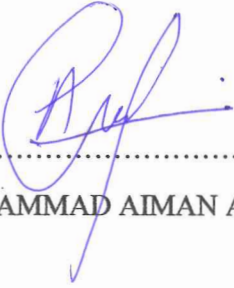
**THEME: PROGRAMMING BASE ON APPLICATION
TITLE: SMART MIXER**

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DECLARATIONS

Here declare that this report is based on the results of their own work with the help of information from sources that are told in confession and also want to declare the results of this project has never produced by any other students as well as from other studies institute.



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DISEMBER 2016

SMART MIXER

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**The Delivery this Report is to Meet the Needs For
Award of Diploma in Electronic Engineering (Computer) in the Department
Electrical Engineering Polytechnic Seberang Perai Polytechnic**

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ABSTRACT

There is the lackness of the laboratory equipment in Polytechnics. The title for the DEE 6092 is suitable to increase the standard of the environment. For this project we build the prototype of Smart Mixer to show our project can make easily for users to blended ingredient .Nowadays everybody has problem to mix all ingredient in one container. This will make community to easy when they want mix all ingredient. So we have create the new project to prevent this problems and save community money. Our project name was called the “Water Mixer”. This project can help community for the industrial sector, farming sector and others. The water mixer project that have been sold at the store now days has same function with our project. But their project dint have the water level detector. Our project has been upgrade to have the Water level detector. Water level detector has maximum and minimum water level. This can make the user much alert to prevent them to put the water over the limit. So this problem can wastage of the water. If they use this water mixer project, they can control the quantity of water that has been use and saving their cost. This project can release the water if the water overflow from the container into the recycle container. So the user can recycle the water for another used.

APPRECIATION

Alhamdulillah to Allah S.W.T because of the being bless with a good health and position during the preparation of Final Report for these Semester that is Semester 6 to fulfill the need for the subject DEE 6092.

A thousand of thanks to our Supervisor, Encik Abdul Rashid bin Alias because guide and lead us to the proper way to prepare the final report for our final year and at the ends finishing the “Smart Mixer”. At the same time, healso gives us moral support and idea when needed.

Most important, a million of thanks to our beloved family for their moral support and financial support that never broken along the way to complete the final report for our final year and at the ends finishing the “Smart Mixer” that given to us for subject DEE 6092.

Not forgetting, a thanks for our beloved friend because willing to help us when we need moral support and ideas in order to complete the Project given to us that is Smart Mixer.

CHAPTER 1

1.1 Introduction

Nowadays everybody has problem overflow water in their water container and stall. This will make community to have the water wasted problem issued. So we have create the new project to prevent this problems and save community money. Our project name was called the “Smart Mixer”. This project can help community for the industrial sector, farming sector and others. The water mixer project that have been sold at the store now days has same function with our project. But their project dint have the water level detector. Our project has been upgrade to have the Water level detector. Water level detector has maximum and minimum water level. If the water was over the maximum level. This can make the user much alert to prevent them to put the water over the limit. So this problem can wastage of the water. If they use this water mixer project, they can control the quantity of water that has been use and saving their cost. This project can release the water if the water overflow from the container into the recycle container and this project can help people to brewing ingredient. So the user can recycle the water for another used.

1.2 Problem statement

There are many traders had to stir the ingredients to make juice. They also need to know the amount of water in a container.

One of problem statement is many people have difficult to stir all ingredient in a short time, especially traders who use substances such as milk, sugar and ice cubes. Next, many traders do not know the quantity of water in container.

1.3 Objective project

- To save the water spilling out from the container.
- To enable users to blended ingredient.

1.4 Scope and Limitation Project

This prototype has few aspects to be taken in concern which is the cost and also the operation of the prototype. The operation of this prototype indicates the function buzzer as aalarm . In order to make sure this prototype achieves its goal proper observation and inspection needed to be carried out correctly and perfectly. This will make user more alert when the buzzer give the sounds signal.

The project scope is to:

1. The wasted water will be decrease.
2. Able the ultrasonic will detect the quantity of water in the container.

Limitation of the project:

1. To be used in our final project.
2. This prototype can only be used for a few quantity of ingredient.

1.5 Conclusion

The production of “Smart Mixer” can reduce the problem of small business entrepreneurs who want to keep their ingredient can be stirred. Additionally, "Water Mixer" affordable for small businesses as a good price and structure that small and easy to carry. Therefore, we decided to produce “Water Mixer” after we did a survey in some places example night market. Finally, the ultrasonic sensor is a simple, affordable, configurable, easy to use and easy to detect something.

1.6 Equipment

- Led
- Button
- Ultrasonic
- Power supply
- Container
- DC Motor
- Relay
- Board
- Mixer

CHAPTER 2

LITERATURE REVIEW

Literature review is a required research that needs to be done by a group to obtain the needed information to ease the process of researching for materials or tools to be used in the project. A lot of research needs to be done so that the product be made will produce positive results. In this project we know how to make a coding for adruino and join wire to adruino. Nowadays people hard to understands about LED. By using adruino it more easier to people understands and it simple to program.

Literature Review 2.1.1

The Water Level Mixer employs a simple mechanism to detect and indicate the water level in an overhead tank or any other water container.

When the water-level is below the minimum detectable level (MDL), the seven segment display is arranged to show the digit 0, indicating that the tank is empty, when the water

reaches level1 (but is below level2) the connection between the probes gets completed (through the conducting medium – water) and the base voltage of transistor increases.

So, the circuit not only capable of cautioning a person that the water tank has been filled up to certain level, but also indicates that the water level has fallen below the minimum detectable level. This circuit is important in appliances such as the water cooler where there is a danger of motor-burnout when there is no water in the radiator used up also it can be used in fuel level indication.

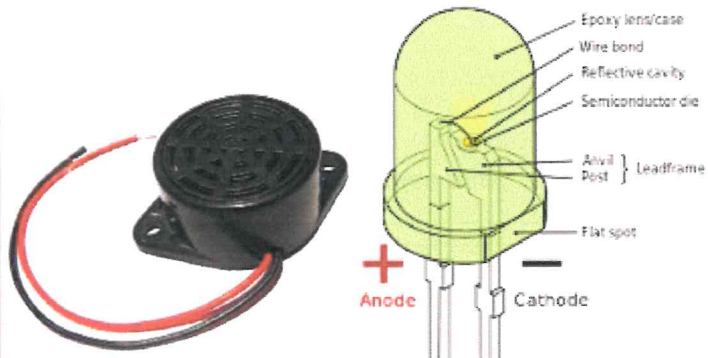
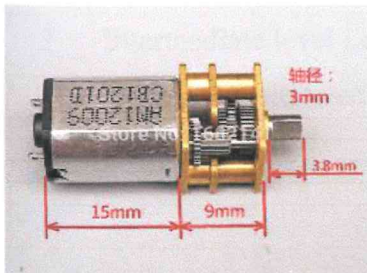
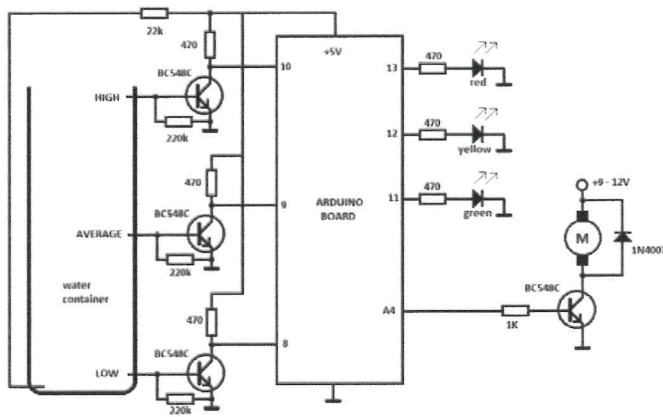


Figure 2.1.1

Water Level Mixer Project Circuit Features:

1. Easy installation.
2. Low maintenance.
3. Compact elegant design.
4. The Automatic water level controller ensures no overflows or dry running of pump there by saves electricity and water.
5. Avoid seepage of roofs and walls due to overflowing tanks.
6. Fully automatic, saves man power.
7. Consume very little energy, ideal for continuous operation.
8. Automatic water level controller provides you the flexibility to decide for yourself the water levels for operations of pump set.
9. Shows clear indication of water levels in the overhead tank.

How Water Level Mixer Project Circuit Works?

The operation of this project is very simple and can be understood easily. In our project “water level mixer” there are 3 main conditions:

1. There is no water available in the source tank.
2. Intermediate level i.e. either of 3rd to 7th level.
3. There is ample amount of water available in the source tank.

So let us discuss more about these 3 conditions

CONDITION 1: Water not available

When the tank is empty there is no conductive path between any of the 8 indicating probes and the common probe (which is connected to 5v+ supply) so the transistor base emitter region will not have sufficient biasing voltage hence it remains in cut off region and the output across its collector will be V_c approximately 4.2v.

As in this case the microcontroller is used in the active low region (which means it considers 0-2 volts for HIGH and 3-5 volts for LOW) now the output of transistor which is 4.2v approximately will be considered as LOW by the microcontroller and hence the default value given by microcontroller to the seven segment display is 0 which indicates as the tank is empty.

CONDITION 2: Intermediate levels

Now as the water starts filling in the tank a conductive path is established between the sensing probes and the common probe and the corresponding transistors get sufficient biasing at their base, they starts conducting and now the outputs will be V_{ce} (i.e. 1.2v-1.8v) approximately which is given to microcontroller.

Here the microcontroller is programmed as a priority encoder which detects the highest priority input and displays corresponding water level in the seven segment display.

In this project while the water level reaches the 7th level i.e. last but one level along with display in seven segment a discontinuous buzzer is activated which warns user that tank is going to be full soon.

CONDITION 3: Water full

When the tank becomes full, the top level probe gets the conductive path through water and the corresponding transistor gets into conduction whose output given to microcontroller with this input microcontroller not only displays the level in seven segment display but also activates the continuous buzzer by which user can understand that tank is full and can switch off the motor and save water.

Water Level Mixer Project Applications:

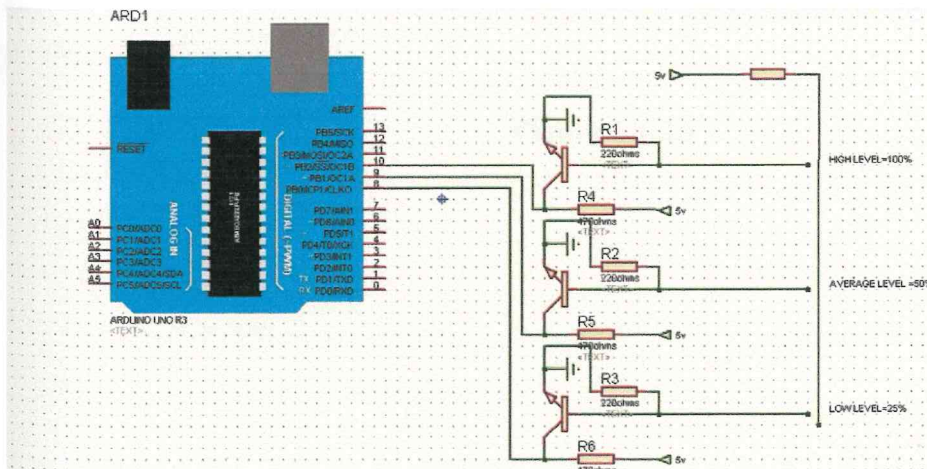
- Automatic Water level Controller can be used in Hotels, Factories, Homes Apartments, Commercial Complexes, Drainage, etc., It can be fixed for single phase

motor, Single Phase Submersibles, Three Phase motors. (For 3 Φ and Single Phase Submersible Starter is necessary) and open well, Bore well and Sump. We can control two motor and two sumps and two overhead tanks by single unit.

- Automatic water level controller will automatically START the pump set as soon as the water level falls below the predetermined level (usually 1/2 tank) and shall SWITCH OFF the pump set as soon as tank is full.
- Liquid level indicator in the huge containers in the companies.

Literature Review 2.1.2

Water-level indicator is used to indicate the level of water in over head tank, by using this we can avoid the overflow of water, and at any time we can know the level of water in tank, it has a simple circuit.



HARDWARE REQUIRED :

ARDUINO UNO:

BC548: BC548 is a general purpose NPN bipolar junction transistor, it is used for amplification and switching purposes, it has three terminals collector-base-emitter.

RESISTORS: Resistor is a current limiting passive two terminal electrical component-resistor act to reduce current flow to led.

RESISTOR VALUES

470OHMS 220 OHMS 22K

INTERFACING CIRCUIT:

the above circuit have three level low, average, high and when level of water increase transistor base get conducted and due to conduction switching process occurs and micro-controller get interrupted and it shows the level based on the respective transistor conduction.

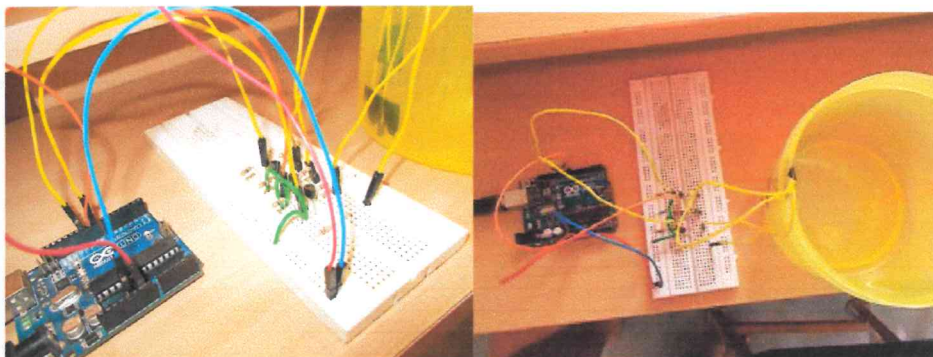


Figure 2.1.2.1

Literature Review 2.1.3

I have a 2S Li-Po battery (7.4v) and I want to control 4 small dc motors (3-5V, [sitesays](#) 22mA at 3V) with an arduinonano PWM signal. The nano is also powered by that battery, **i do not want another external battery.**

So I thought about regulating the 7.4v from the battery to 5v and then there are 2 option that I saw:

1. use a NPN Transistor, Resistor 330Ω, Diode (1N4004) and use this setup: (**But power the motors from the regulated external battery and not the arduino 5V like in the picture**)

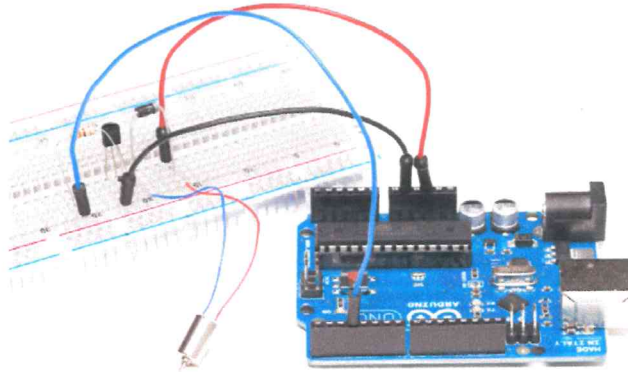
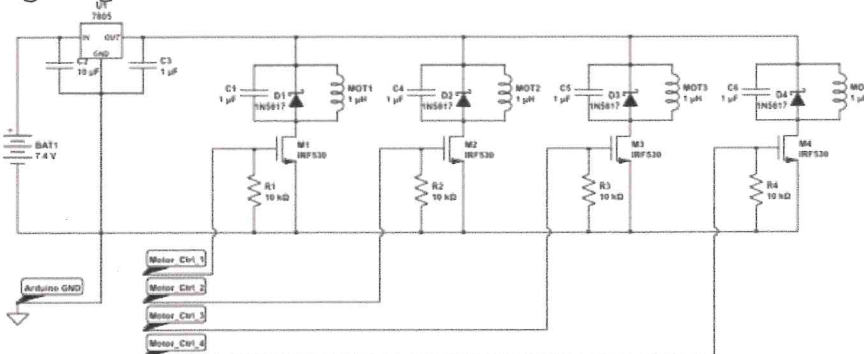


Figure 2.1.3.1

Do I need 1 regulator and split the output

Option 1: Single regulator for all 4 motors:



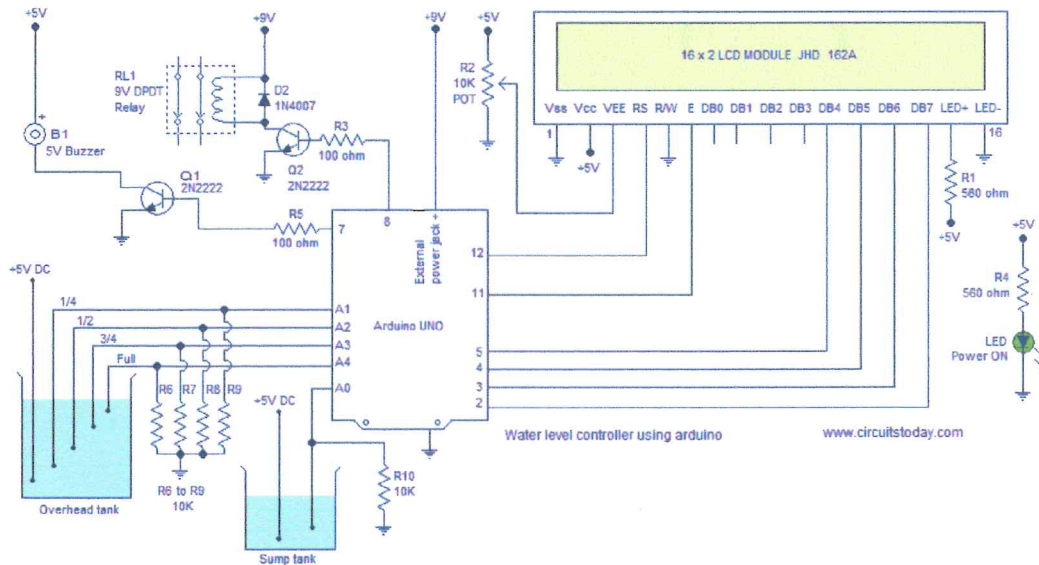
- This would work fine, and a 1.5 A regulator would run pretty well on normal operation load of $22 * 4 = 88 \text{ mA} = \sim 100 \text{ mA}$. For a linear regulator (e.g. 7805) the normal running dissipation would be around $(7.4 - 5) \times 0.1 = 0.24 \text{ Watts}$, which isn't much for a TO220 regulator package.
- Remember to add a capacitor of say 1 μF at each motor, parallel to the reverse biased diode already shown in the question, to bypass some of the commutation noise the motor must generate

Literature Review 2.1.4

Arduino water level controller / indicator.

This article is about a fully functional water level controller using Arduino. The circuit displays the level of water in the tank and switches the motor ON when the water level goes below a predetermined level. The circuit automatically switches the motor OFF when the tank is full. The water level and other important data are displayed on a 16×2 LCD display. The circuit also monitors the level of water in the sump tank (source tank). If the level in side the sump tank is low, the motor will not be switched ON and this protects the motor from dry running. A beep sound is generated when the level in the sump tank is low or if there is any fault with the sensors.

Circuit diagram.

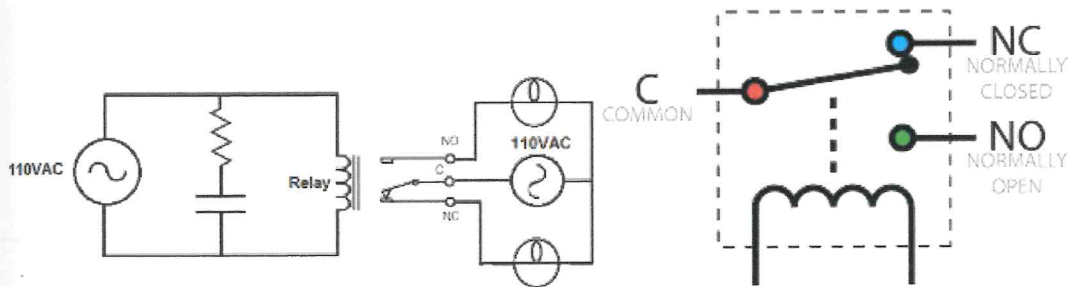


The circuit diagram of the water level controller using Arduino is shown above. Conductive method is used to measure the level. The sensor assembly consists of four aluminum wires arranged at 1/4, 1/2, 3/4 and full levels in the tank. The dry ends of these wires are connected to analog input pins A1, A2, A3 and A4 of the Arduino respectively. A fifth wire is positioned at the bottom of the tank. Resistors R6 to R9 are pull down resistors. The dry end of this wire is connected to +5V DC. When the water touches a particular probe, electrical connection is established between that probe and the +5V probe because water has slight

conductivity. As a result current flows through that probe and this current is converted into a proportional voltage by the pull down resistor. Arduino reads the voltage dropped across each pull down resistor for sensing the level of water in the tank. Same method is used for measuring the level of water in the sump tank.

Digital pin 7 of the Arduino controls the buzzer and digital pin 8 controls the motor.

Transistor Q1 drives the buzzer and resistor R5 limits the base current of Q1. Transistor Q2 drives the relay. Resistor R3 limits the base current of Q2. D2 is a freewheeling diode. POT R2 is used to adjust the contrast of the LCD. resistor R1 limits the current through the back light LED. Resistor R4 limits the current through the power ON LED. Complete program for the water level controller using Arduino is given below.



Circuit for Relay

CHAPTER 3

METHODOLOGY PROJECT

3.1 Introduction

Methodology is the systematic, theoretical analysis of the methods applied to a field of study. It comprises the theoretical analysis of the body of methods and principles associated with a branch of knowledge. Typically, it encompasses concepts such as paradigm, theoretical model, phases and quantitative or qualitative techniques.

A methodology does not set out to provide solutions - it is, therefore, not the same as a method. Instead, a methodology offers the theoretical underpinning for understanding which method, set of methods, or best practices can be applied to specific case, for example, to calculate a specific result.

It has been defined also as follows:

1. "The analysis of the principles of methods, rules, and postulates employed by a discipline"

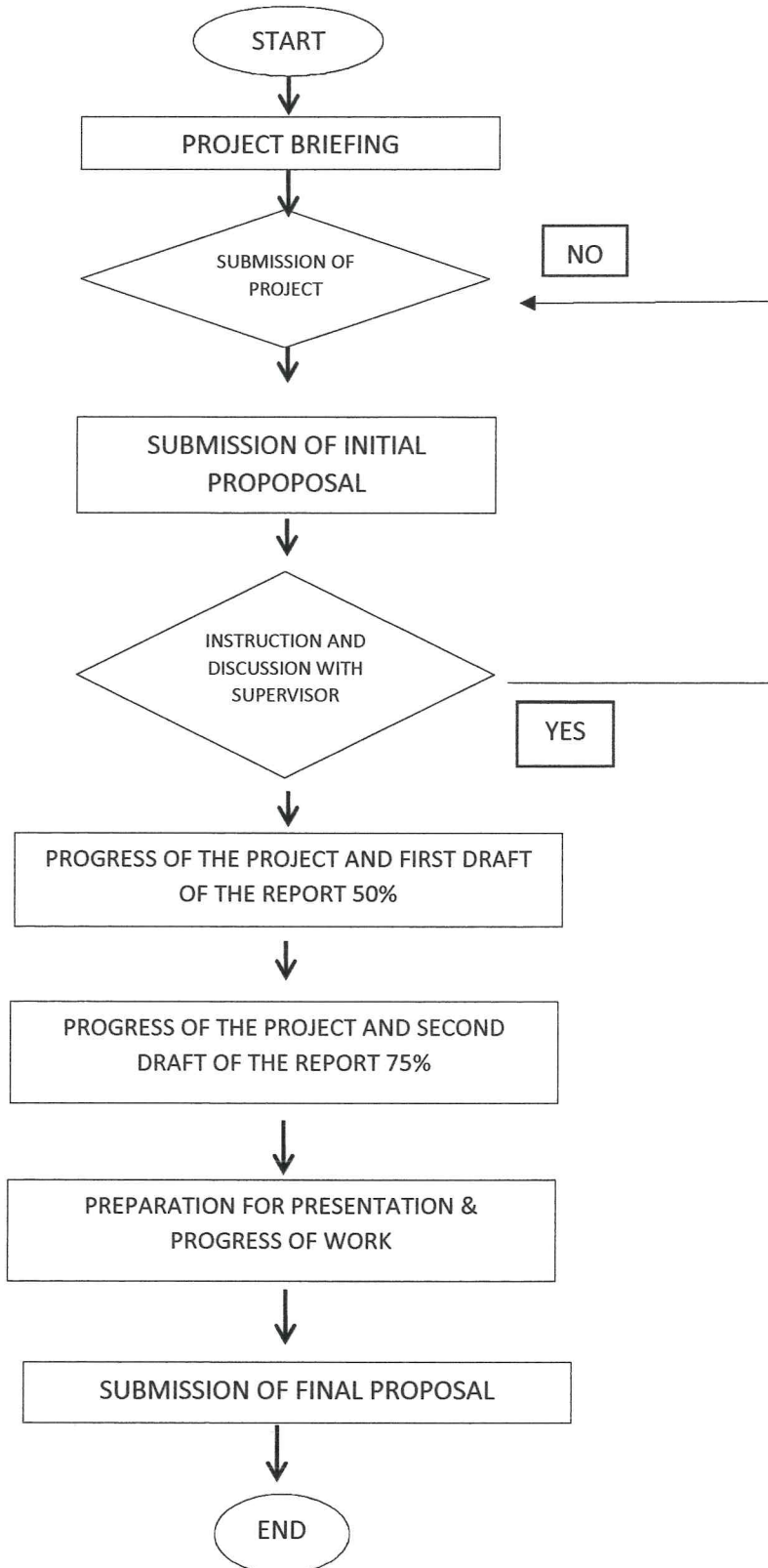
2. "The systematic study of methods that are, can be, or have been applied within a discipline"
3. "The study or description of methods".

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 processed needs to be done according to proper procedures to ensure that projects so not have any problems.

Among the measures the work done in preparing this project are:-

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

3.1.1 Flow Chart Plan of Project



3.2 Gantt Chart

ACTIVITY/WEEK	W E E K	W E E K	W E E K	W E E K	W E E K	W E E K	W E E K	W E E K	W E E K	W E E K	W E E K	W E E K	W E E K	W E E K	W E E K	W E E K	W E E K	W E E K
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Students Registration																		
Project Briefing																		
Submission of Project Title																		
Submission of Initial Proposal																		
Assistance and Discussion																		
Progress of the Project and Second Draft of the Report 50%																		
Progress of the Project and Second Draft of the Report 75%																		
Preparation for Presentation																		
Presentation																		

3.3 Draw Schematic Diagram of using PROTEUS.

PROTEUS version 8 Professional allows professional engineers to run interactive simulations of real designs, and to reap the rewards of this approach to circuit simulation. And then, a range of simulator models for popular micro – controllers and a set of animated models for related peripheral devices such as PIC and transistor, resistor, and more. It is possible to simulate complete micro – controller systems and thus to develop the software for them without access to a physical prototype. In a world where time to market is becoming more and more important this is a real advantage. Structurally, Proteus 7 Professional separated into two main components, which are ISIS 7 Professional and ARES 7

Professional. ISIS 7 Professional mainly involved on circuit designing and simulation. In our project, we use Protues to design a schematic diagram.

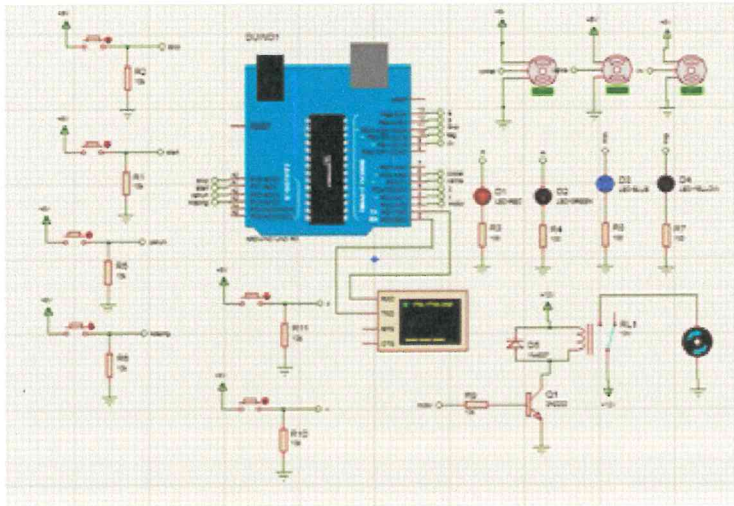


Figure 3.3.1 Schematic Diagram using PROTEUS

3.4 Process of the Circuit Designing

3.4.1 Design the Circuit Diagram

After decide what kind of project that we want to build. We need to make research about the circuit, electronic component that we need to used, hardware and so on. These things actually can help us to make a better in designing circuit. For example, we need to know the size, foot of component, polarity of the component, the component method compilation and etc. to make a circuit diagram. In the first step in Circuit Designing process is make a circuit diagram that can be used in the next process. Among steps in the circuit diagram are:-

- i. Before the circuit is produced, the things that we need to be emphasized are the position of symbols and components used in the Schematic circuit. Once we know the entire production circuit, the circuit can be drawn using special software, namely Proteus ISIS 7 Professional.
- ii. Then, make sure that the connection of the component is correct.