MOTION SENSOR LIGHTING CONTROL

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SESSION

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RECOGNITION

Here I declare that this report is based on the work of our own with the help of information from sources that are told in confession. We also declare the results of my project was never produced by any other student as well as students from other institutions.

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ABSTRACT

Motion sensor lighting control is to procedure a tool in the daily electricity consumption is controlled automatically by devices which detect the movement of a person. Through this project also indirectly facilitate the use of electrical appliances such as light. With this system, an attitude that is often forgotten in the closing electrical switches can be controlled automatically with only detects movement. In addition, through this project can also save electricity in daily life. Hopefully any information which will be explained in many ways readers can also benefit us. In addition, it can provide guidance and strength in the face of all the problems we confronted when I will make a real project.

ABSTRAK

Gerakan kawalan sensor lampu adalah untuk prosedur alat dalam penggunaan elektrik setiap hari secara automatik dikawal oleh peranti yang mengesan pergerakan seseorang. Melalui projek ini juga secara tidak langsung memudahkan penggunaan peralatan elektrik seperti cahaya. Dengan sistem ini, sikap yang sering lupa ketika dalam menutup suis elektrik boleh dikawal secara automatik dengan hanya mengesan pergerakan manusia. Selain itu, melalui projek ini juga dapat menjimatkan penggunaan elektrik dalam kehidupan harian. Mudah-mudahan dengan maklumat ini yang akan diterangkan hati pembaca juga boleh memberi manfaat. Di samping itu, ia dapat memberikan bimbingan dan kekuatan dalam menghadapi semua masalah apabila membuat projek sebenar.

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Do not forget to lecturer in the Department of Electrical Engineering who was also involved in giving us guidance throughout the project. Lastly, thanks to all those involved and without the cooperation of you it is impossible for us to participate in this project. May God repay and service of you who have helped us in this project. Thank you.

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CHAPTER 1

INTRODUCTION

1.1 Background Project

This project is to produce a tool in the daily electricity consumption is controlled automatically by devices which detect the movement of a person. Through this project also indirectly facilitate the use of electrical appliances such as lights and fans. With this system, an attitude that is often forgotten in the closing electrical switches can be controlled automatically with only detects movement. Motion Sensor Lighting Control is our title to choices in our project.

Through this project, we want to use "Passive Infrared" sensors that can detect the movement of a person with a certain distance. When this sensor detects movement he can turn on the lights and the fan directly to these sensors also function as a switch.

1.2 Problem Statement

Based on the problem, we see the often forgotten in the closing of electrical equipment such as lights and fans separately when detect human movement. Besides that, the use of electrical devices that are not controlled.

1.3 Objective

The objective of this project is to solve the problem about forget the closing of the electrical appliances automatically. After that, this also can reduce the electricity consumption by more restrained when it detects human movement.

The objective of this project was to design a Motion Sensor Lighting Control with sensor PIR system for indoors that would use electric in a more efficient way, in order to prevent electric loss mostly and minimize the cost of life now.

Besides that, this project to build a system that can save electric use in a day. This project also to build a safety system and installation costs.

A critical consideration is the installation costs, since costs generally determine the feasibility and viability of a project. The installation must be simple enough for a domestic user.

1.4 Scopes of Project

The scope of the project should be made as a reference to ensure that the implementation of the project is not out of the objective to be achieved. The scope of the project is determined by the objectives or goals of the project. Therefore, this project use a arduino. Arduino is an important part in this project Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs of a coding that must build to fuctions of all circuit in project. This product was designed to compare the cost of materials and designs available. In this project also, use a Passive Infrared Sensor (PIR). This sensor is fuction to detect the movement of human. In addition, this project use to type of relay. Relay is fuction to control the lighting and fan in this project. Relay circuit DC is to control the fan and type of relay is a double pole double throw (DPDT). Relay circuit AC is to control the lighting and type of relay is a single pole double throw (SPDT).

1.5 Term Definition

Terms described more in depth about this project are as follows:

a) Arduino.

Arduino is an important part in this project Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board.

b) Resistor.

A resistor restricts current flow in an electrical circuit without switching the current off. A variable resistor allows more control over current flow by changing the amount of resistance. When resistance increases in a variable resistor, the amount of current that is allowed to flow in a circuit decreases.

c) Passive Infrared Sensor (PIR).

PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. They are small, inexpensive, low-power, easy to use and don't wear out.

1.6   Conclusion

In conclusion, this paper discusses the overall project to be carried out and project background. Next, identify problems and solve the problem. In addition, display materials needed to make the project and lists the total cost required for this project.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

A literature review is a body of text that aims to review the critical points of current knowledge and or methodological approaches on a particular topic. Literature reviews are secondary sources, and as such, do not report any now or original experimental work.

Most often associated with academic - oriented literature, such as theses, a literature review usually precedes a research proposal and results section. Its ultimate goal is to bring the reader up to date with current literature on a topic and forms the basic for another goal, such as future research that may be needed in the area. A well - structured literature review is characterized by a logical flow of ideas, current and relevant references with consistent, appropriate referencing style, proper use of terminology and an unbiased and comprehensive view of the previous research on the topic.

The report that we want to be produced needed a few factor that should be taken consideration until that project implemented. To get a quality project result, we need to study about the type of material, design, components that we used, installation method and maintenance, and so on that we need make it and consider that result that we get. This is all ensure that no any problems would arise during the completion or even when presenting project.

Hence, systematic and detailed planning must be arranged for produce a complete and perfect project. First step that we need made it, was design daub (sketching) for get the real image of machine that we want made to be produced. Due to this, the work design and study that we made is a continuing process and it involving probelm solving activity creatively namely which is known as literature study.

2.2 Components of the Project

2.2.1 Resistor

Figure 2.2.1 : Resistor

Resistors are electronic devices that allow electrical current to flow through it had in memnghasilkan circuit and voltage drop at both terminals. This resistor also is one of the indispensable components for all electronic circuits. Resistors are usually always associated with Ohm's Law, which states that V = IR, where V is voltage, I is current and R is the resistance. In the field of electronic Ohm's Law is a principle that must be studied and understood in advance. Resistors also have two legs, usually used in electronic circuits. It also has no positive or negative polarity and it is a passive device. Resistors are usually used carbon is a brand-sized 1/4 watt and 1/2 watt. Function as the limiting resistor is often a flow of electric current.

Each resistor has a resistance value of its own. To determine the resistance of the resistor is written on top of it which was shown by the color code. Each color is also represented by its own value that has been set in Ohm's Law. For example, like the red color represents the number two. Normally there are four color codes on each resistor. The resistor value is in the range of Ohm. One way to determine the value of this resistor is using Ohm meter or meter range.

2.2.2   Transistor

Figure 2.2.2 : Transistor

Basically transistor has three legs. Each leg has a specific name and function. It is a component polarity and contain elements N and P transistors in two types to be aware of NPN and PNP transistors.

Each transistor has a specific function in accordance with the number that appears on the body of the transistor. Basically transistor acts as an amplifier, regulator and also acts as a switch. Its transistor operates is dependent on the three legs of the collector (collector or C), the base (base or B), and producer (emmiter or E). The code of this transistor can also be found on the body of the transistor is shown as NPN or PNP. To determine the position of the foot C, B, and E can be determined with a multimeter on Ohm range. These transistors are easily damaged or burned if not proper connector leg or the use of electric currents that exceed the prescribed limits. The transistor also has a number of specific groups such as FET transistor, UJT, MOSFET, and more.

2.2.3 Arduino Uno
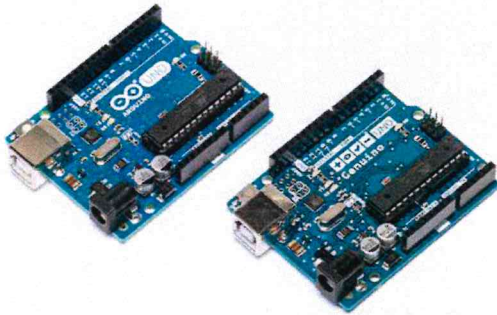
Figure 2.2.3.1 : Arduino Uno   Figure 2.2.3.2 : Structure Arduino Uno
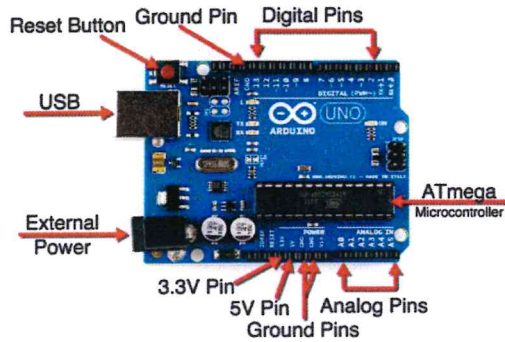
Arduino/Genuino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your UNO without worring too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

Technical specs

Microcontroller	ATmega328P
Operating voltage	5V
Input voltage (recommended)	7 - 12V
Input voltage (limit)	6 - 20V
Digital I/O Pins	14(of which 6 provide PWM output)
PWM digital I/O Pins	6
Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA

Table 2.2.3.1

2.2.4 Passive Infrared Sensor (PIR)
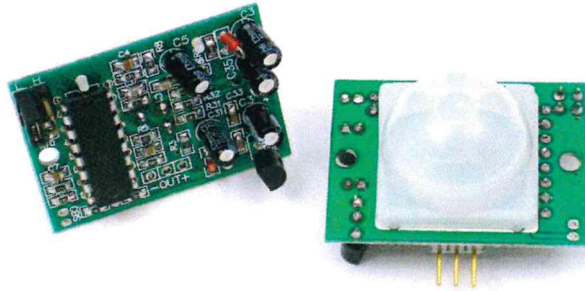
Figure 2.2.4.1 : Passive Infrared Sensor (PIR)
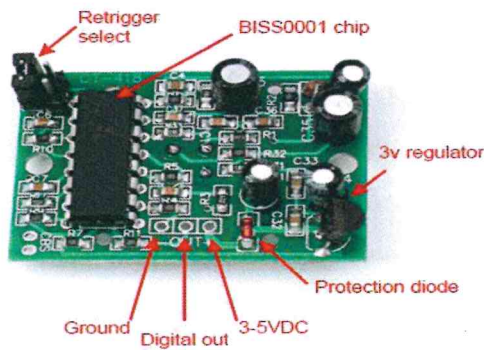
Figure 2.2.4.2 : Structure Passive Infrared Sensor (PIR)

PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range. They are small, inexpensive, low-power, easy to use and don't wear out. For that reason they are commonly found in appliances and gadgets used in homes or businesses. They are often referred to as PIR, "Passive Infrared", "Pyroelectric", or "IR motion" sensors.

Output: Digital pulse high (3V) when triggered (motion detected) digital low when idle (no motion detected). Pulse lengths are determined by resistors and capacitors on the PCB and differ from sensor to sensor.

Sensitivity range: up to 20 feet (6 meters) 110 degrees x 70 degrees detection range

Power supply: 3.3V - 5V input voltage

2.2.5 Double Pole Double Throw Relay (DPDT).
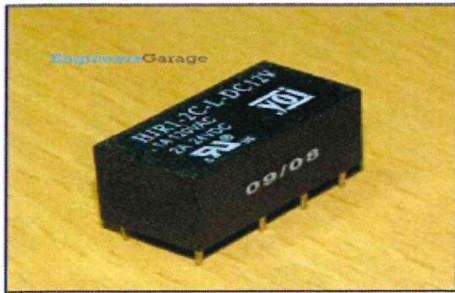
Figure 2.2.5.1 : DPDT Relay
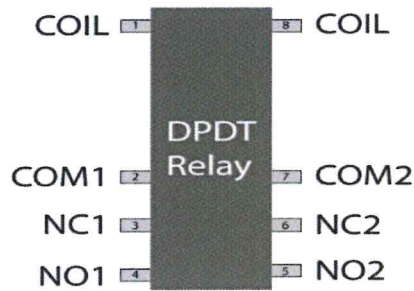
Figure 2.2.5.2 : Pin Diagram DPDT Relay

DPDT stands for double pole double throw relay. Relay is an electromagnetic device used to separate two circuits electrically and connect them magnetically. They are often used to interface an electronic circuit, which works at a low voltage to an electrical circuit which works at a high voltage. Relays are available in different configuration of operating voltages like 6V, 9V, 12V, 24V etc.

There are two sections input and output. The input section consists of a coil with two pins which are connected to the ground and the input signal. The output section consists of contactors which connect or disconnect mechanically. The output section consists of six contactors with two sets. Each set has three changeover contacts, namely, normally open (NO), normally closed (NC) and common (COM). When no supply is given the COM is connected to NC. When the operating voltage is applied the relay coil gets energized and the COM changes contact to NO.

DPDT relay can be used to power wither one device/appliance or another. While SPDT relay can only switch the output circuit between on and off states; a DPDT relay can also be used to change the polarity at the terminals of a device connected at output.

2.2.6   Single Pole Double Throw Relay (SPDT).
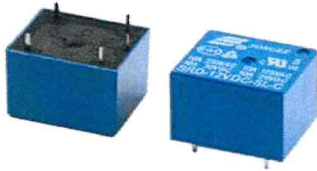
Figure 2.2.6.1 : SPDT Relay   Figure 2.2.6.2 : Pin Diagram SPDT Relay

The 2 COIL terminals is where the voltage is placed in order to energize the coil. Place the relay's rated coil voltage on these terminals. The polarity of the voltage does not matter. A positive and negative voltage can be placed on either end. Polarity only matters if a diode is used.

The COM terminal is the common terminal. If the COIL terminals are energized with the rated voltage, the COM and the NO terminals have continuity. If the COIL terminals are not energized, then the COM and the NO terminals have no continuity.

The NC terminal is the Normally Closed terminal. It is the terminal that can be powered on even if the relay doesn't receive any or sufficient voltage to operate.

The NO terminal is the Normally Open terminal. It is the terminal where you place the output that you want on when the relay receives its rated voltage. If there is no voltage to the COIL terminals or insufficient voltage, the output is open and receives no voltage. When the COIL terminals receive the rated voltage or a little under, the NO terminal receives sufficient voltage and can turn on the device on the output.

2.2.7 PCB Board
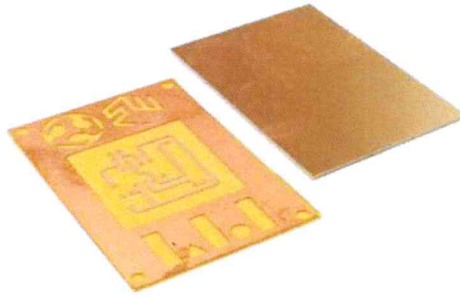
Figure 2.2.7 : PCB Board.

Printed Circuit Board (PCB) is a circuit board that is used as a connecting strip conductors and arranging park electronic components. What is meant by the conductor path is the wiring system between components as part of the relationship and the electrical data on the components. Various forms of PCBs are generally available on the market is the PCB Matrix Strip Board (Board Matrix Striped) and Cooper Clad PCB (copper plated).

CHAPTER 3

METHODOLOGY

3.1 Introduction

In this chapter, what is stated on the step and the implementation of the project as shown in the figure below. All procedures were performed according to the gantt chart Session in June 2016 (5th semester) and December 2016 session (6th semester). Every week we have been following the procedures that have been built in the gantt chart with good and proper. Gantt chart procedures to be followed on the chart as it will help there by guiding the students to complete the project on time has been set. The step and implementation of the project has been built in the flow chart below.

Methodology can be themanalysis 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 procedures or set of procedures.

Methodology includes a philosophically coherent collection of theories, concept or ideas as they relate to a particular disciple 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 researches.

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 errors occurs it can make a project probably could not operate or do not look eat and perfect. Before the project finish, various process needs to be done according to proper procedures to ensure that projects do not have problems. Among the measures the work done in preparing this project.
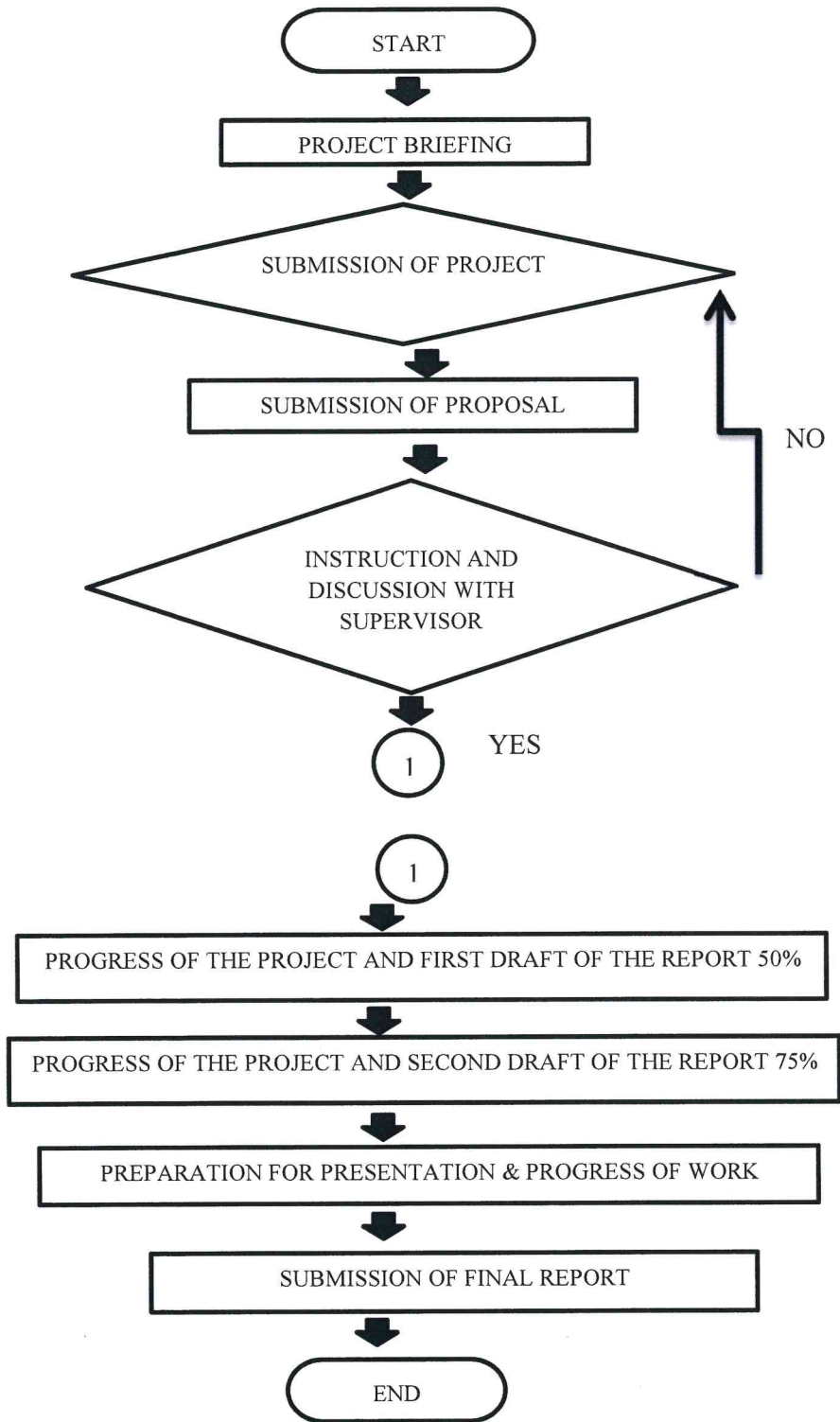
Figure 3.1: Flow Chart Project Implementation

No.	Project progress	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	Talks related to the theme of the project	■														
2.	Identify projects		■													
3.	Selecting projects that fit the theme			■												
4.	Talks related to the project proposal				■											
5.	Selecting projects					■										
6.	Data collection and analysis projects						■	■								
7.	Setting objectives / targets								■							
8.	Proposed solutions									■						
9.	Presentation and approval of the management										■					
10.	Implementation											■	■			
11.	Assessment and monitoring													■		
12.	Standardisation														■	■

Table 3.1 : Gantt Chart

3.2 Description of Methodology

A schematic of the circuit that we have built, the process of studying done more earlier, in order to understand the circuit. Then, the process of testing each component is run to ensure that all components function properly. After completion of the required test each component can then build the circuit to be done in the next process. For this etching process, we have built a circuit to PCB etching using a software wizard. If the circuit is properly reversed and transferred to the PCB board using UV process in order to littering. When the process of tracing paper littering ensure uninterrupted circuit on paper. Tracing paper shall be attached to the PCB board and must ensure that the paper does not catch a cold.

When finished making process littering and UV processes and inspections carried out several times, only then can the next process of etching process. Before the next process, tracing paper attached to the PCB board should be removed. Etching process is a process for removing unwanted kumprum of PCB board using acid. Acid which we use in the process of removing kumprum is febric cloride. Mengasid process is performed after satisfied with the lettering. Finish off kumprum, we must also remove the chopper using Developers. After completing the etching process as a whole, the PCB board should be dried first and then work to drill holes marked so neat and does not pose a problem when entering and further processing components that process pematri components used. While drilling, the "drill" to be right in the middle of the hole marked.

Checks should be made on the PCB board first after the punch holes to ensure that there is a circuit on the PCB board are not disconnected. After the inspection done before making brazing process is carried out. The brazing or soldering process components on the PCB board should be carried out one by one to ensure that the components are installed in the right place and that has been designed. After completion of soldering all the components, the circuit is ready to be tested, and fully functional. For the next sub-topics, each process will be explained in detail separately.

3.3 Implementation

3.3.1 Finding and Selecting Project Title

As part of this process is the very first step is carried out once before the start of the work associated with each of the project until the project is completed. Heading the project is sought must be appropriate to the level of diploma because it is a final project during his studies in the diploma program. For the selection of this title, the student must choose an appropriate title to the themes that have been prepared for each session at the time.
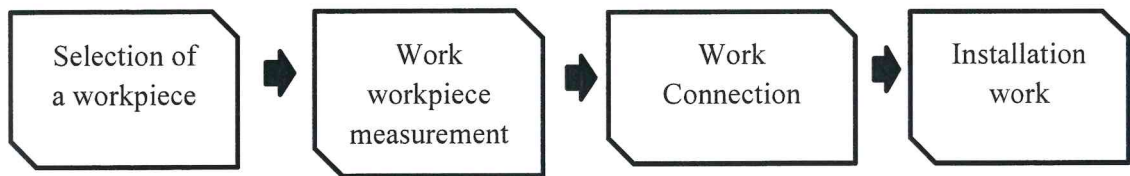
| Selection of a workpiece | → | Work workpiece measurement | → | Work Connection | → | Installation work |

Figure 3.3.1 : Step-step of Project.

3.3.2 Component Testing Process

This component testing process can be performed after the circuit to be made and the components of the circuit is required. Purchase circuit components should also be designed to avoid the problems that will arise. After purchasing the circuit components, each component must be tested to ensure no defective components and circuits can affect us. The process of testing these components can enable us to detect damage before the installation process circuit for the circuit to function properly.

3.3.3 Printed Circuit Design

For the process of designing the printed circuit is a process that will begin prior to the next process. In the process of designing this circuit, we have been using the software PCB Wizard. Among the objectives of the process of designing this circuit is to:

i.   To facilitate the process of soldering the components on the circuit is done later.

ii. To save space on the PCB board to prevent the occurrence of any duplication of components.

iii. To facilitate the re-examination in the event of any error in the circuit.

iv. To show that the circuit is ready to look neat and orderly on the PCB board later.

PCB board is an electronic circuit board that has streaks replace wiring circuits in which the components located on it. PCB board has two faces:

i.   Under the gaze of PCB board (the circuit was designed).

ii. The views of the PCB board (the component to be soldered)

When designing the circuit, below are the steps you need to take care to avoid any mistakes happen and thus avoid wasting time. Here are the steps necessary to:

i.   Make sure the circuit is not inverted from the view that real after its completion.

ii. Designed to ensure that the circuit is small, compact and organized accordingly so that it looks neat on all components used after completion.

iii. When making their way to the circuit, make sure each hole to be drilled will be appropriate and right to walk the components used.