# CONTENT

# DIARGRAM

# CHAPTER 1

## INTRODUCTION

### 1.1 Background Project

For this project we build the prototype of Smart Parking to show our project can make easily for people have a parking quickly. Currently, most of the existing car parking system are manually managed and little inefficient. Besides, when we go to the Mall, office or anywhere we also need to find a car park. Sometimes, we take too much hours to find the parking for our car. So with this application of smart parking it can help you to find a parking in easiest way without wasting our time because we already know that the place have a parking and the parking were arranged. In addition, the parking has calculation if the parking were already full so that we cannot come in to the parking place. Based on our project, we will try to settle all the problem of car parking. We have named our project as a Smart Parking where is can make people know if the parking still have or not too make us easy to find where the empty place for parking.

## 1.2 Problem Statement

In this case, the parking lot of any places can make overall of people difficult to find the empty place of parking but for this project will make people easier to find the empty lot of parking at any car park. For the example, it is because when someone running late to office, our project which the smart parking really can help to find the parking easily. Furthermore, in the city areas where the number of vehicles is higher as compared to the availability of parking spaces, there has a lot of time being wasted in searching for parking location so with using our Smart Parking it can help us to avoid this problem.

## 1.3 Objective

- To build system that can detect where the empty parking
- To make parking that have notification where how much parking left

## 1.4 Scope of Limitation Project

This prototype has three parts in systems of smart parking. Firstly, the one of part is a gate before entered the car park (servo motor react like a gate) , produced for count down amount of car when entered to the parking lot. If the slot of parking in car park has full, the component of 7 segments will display the value left for parking is zero (0). After that, second of part in this project is to display an available or non-available place of parking, produced for easily to find the available or not into the car park. If has available of parking the green LED is ON and then if the lot of parking is non-available the red LED will be react to switch ON then the green LED automatically is switch OFF. Finally, last of part for this prototype is a gate before leave the car park, is produced for count up the amount of car when leave out of car park. The component of 7 segments will count up for zero into nine values (0-9).

The project scope is to:

- To provide facilities for people easier to get a parking.
- To produce the innovation of smart parking in the country.
- To make sure the vehicle consumer is easier find a parking.

# 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 source, and as such, do not report any new or original experimental work.

Most often associated with academic-oriented literature, such as those, 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 basis for another goal, such as future research that may be needed in the area. A well-structure 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, framework installation, installation method and maintenance, level of product safety, structural strength, project size and so on that we need make it and consider the result that we get. This is all ensure that no any problems would arise during the completion or even when presenting the 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 circuit for get real circuit that we want to produced. Due to this, the design and study that we made is a continuing process and it involving problem solving activity creatively namely which is known as literature study.

## 2.2 SPECIFICATION OF PROJECT

Voltage In (Vin) = 5 volt

Voltage Out (Vout) = 2.3 volt

Resistor (R) = 470 ohm

### 2.2.1 Hardware Requirements

The hardware components used in this project parking system are as follows:

- Arduino Uno
- Switch Pad
- Servo Motor (4.8V – 6V)
- Common Anode 7 Segment Display
- Light Emitter Diode (LED)
- Power Supply (Powerbank or Cell)
- USB Cable

## 2.3 Components

### 2.3.1 ARDUINO/GENUINO UNO

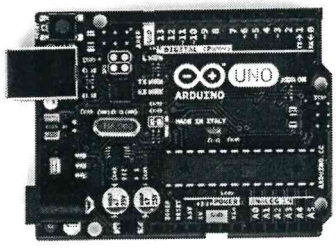



**Figure 2.3.1.1 ARDUINO/GENUINO UNO**

Arduino UNO is an open – source project that created microcontroller – based kits for building digital devices and interactive objects that can sense and control physical devices. The project is based on microcontroller board designs, produced by several vendors, using various microcontrollers. These systems provide sets of digital and analog input/output (I/O) pins that can interface to various expansion boards (termed shields) and other circuits. The boards feature serial communication interfaces, including Universal Serial Bus (USB) on some models, for loading programs from personal computers. For programming the microcontrollers, the Arduino project provides an integrated development environment (IDE) based on a programming language named Processing, which also supports the languages C and C++. This component is easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. Common examples of such devices intended for beginner hobbyists include simple robots, thermostats, and motion detectors.

### 2.3.2 Servo Motor 9g (4.8V – 6V)

**Figure 2.3.2.1 Servo Motor 9g (4.8V – 6V)**

A servomotor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback.

### 2.3.3 Switch Pad

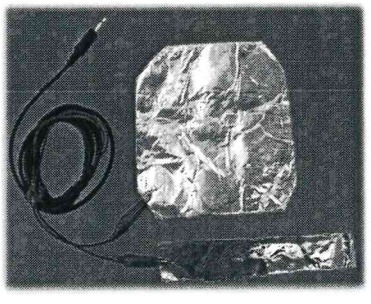


**Figure 2.3.3.1 Switch Pad**

A switch pad is a form of switch that closes an electrical contact when a certain set pressure has been reached on its input. The switch may be designed to make contact either on pressure rise or on pressure fall. Another type of pressure switch detects mechanical force; for example, a pressure – sensitive is used to automatically open gate on this project.

### 2.3.4 Common Cathode 7 Segment Display

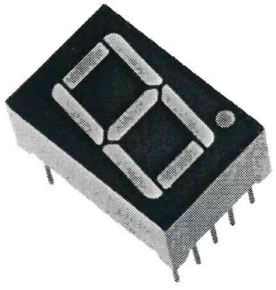


**Figure 2.3.4.1 Common Anode 7 Segment Display**

There are two types of LED 7 – segment displays: common cathode (CC) and common anode (CA). The difference between the two displays is the common cathode has all the cathodes of the 7 – segments connected directly together and the common anode has all the anode of the 7 – segments connected together.

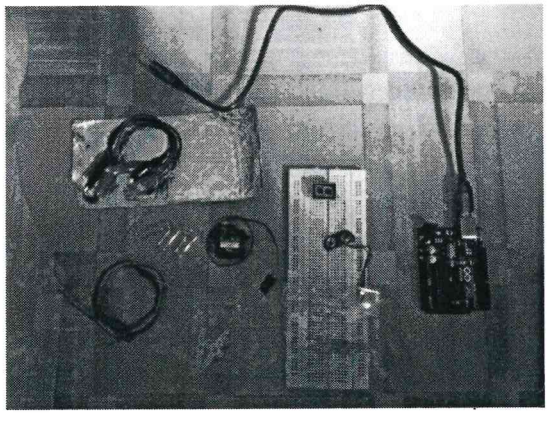


**Figure 2.3.4.2 Overall Component**

# CHAPTER 3

## METHODOLOGY

### 3.1 INTRODUCTION

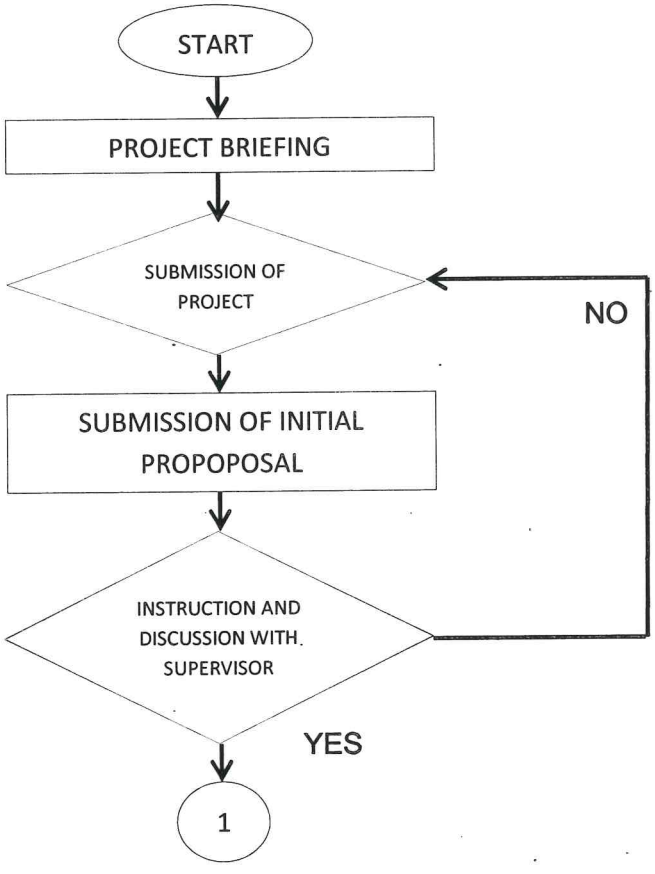
Methodology can be the 'analysis of the principles of methods, rules, and postulates employed by a discipline', 'the systematic study of methods that are, can be, or have been applied within a discipline' or 'a particular procedure or set of procedures'.

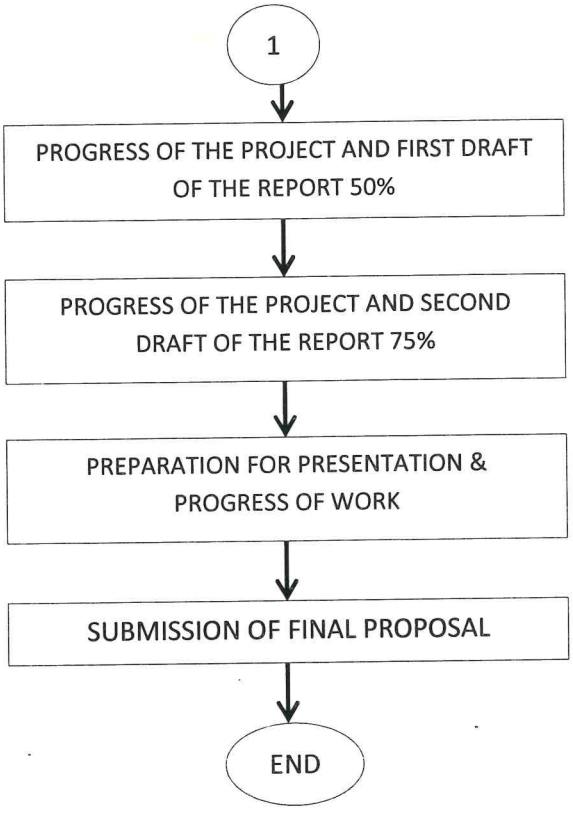
Methodology includes a philosophically coherent collection of theories, concepts or ideas as they relate to a particular discipline or field of inquiry. Methodology refers to more than a simple set of methods, rather it refers to the rationale and the philosophical assumptions that underlie a particular 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 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






### 3.1.2 Flow Chart 1.0: Plan of Project

### 3.2 Gantt Chart

| ACTIVITY/WEEK | WEEK 1 | WEEK 2 | WEEK 3 | WEEK 4 | WEEK 5 | WEEK 6 | WEEK 7 | WEEK 8 | WEEK 9 | WEEK 10 | WEEK 11 | WEEK 12 | WEEK 13 | WEEK 14 | WEEK 15 | WEEK 16 | WEEK 17 | WEEK 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 7 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 LCD displays, 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 Proteus to design a schematic diagram.

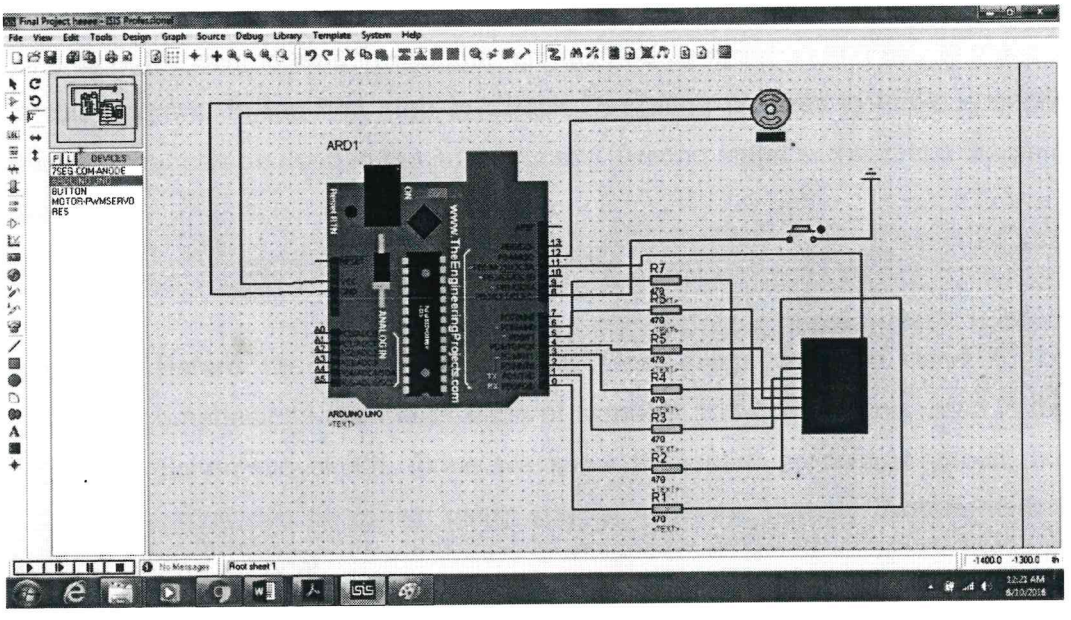



**Figure 3.3.1 Schematic Diagram using PROTEUS**

## 3.4 Simulate the Circuit using Proteus

After completing the circuit assembly and configuration, now it time to verify whether the source code compiled is virtually accurate or not. Proteus offer a whole lot of variety virtual devices. In fact, simulation using oscilloscope and

function generator can be done using Proteus. Even virtual hyper terminal is provided to demonstrate how your code performs in real world without really doing the hardware section yet.


**Figure 3.4.1 Toolbar of Proteus Simulation**

## 3.5 Process of the Circuit Designing

### 3.5.1 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.

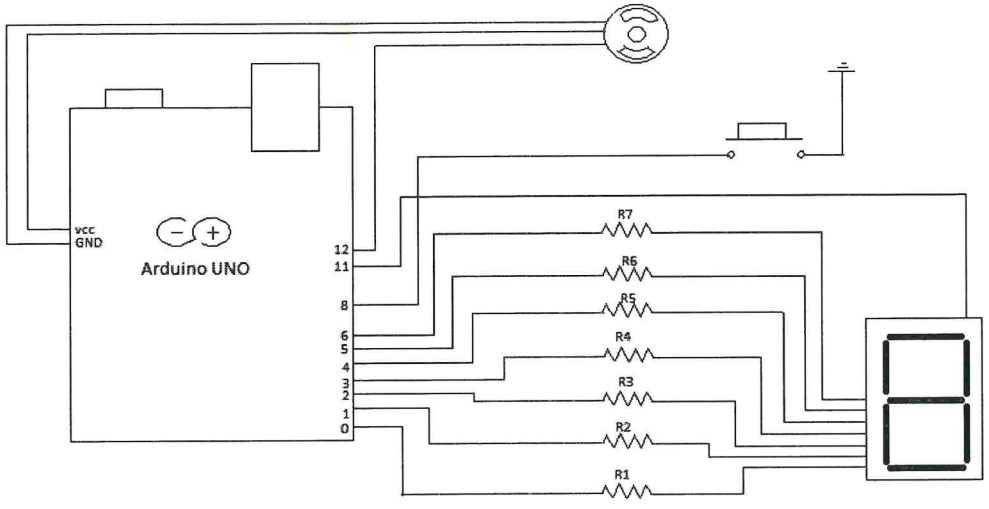



**Figure 3.5.1.1 Circuit Diagram**

## 3.6 Etching

Etching is a "subtractive" method used for the production of printed circuit boards. Acid is used to remove unwanted copper from a prefabricated laminate. This is done by applying a temporary mask that protects parts of the laminate from the acid and leaves the desired copper layer untouched. Etching is where the excess copper is removed to leave the individual tracks or traces as they are sometimes called. Buckets, bubble tanks, and spray machines lots of different ways to etch, but most firms currently use high pressure converyerised spray equipment. Many different chemical solutions can be used to etch circuit boards. Ranging from slow controlled speed etches used for surface preparation to the faster etches used for etching the tracks. Some are best used in horizontal spray process equipment while others are best used in tanks.

### 3.6.1 Risk of Etching

i. There is a risk of injuries due to the chemicals involved.

ii. The quality of the results depends on several factors which you won't be able to master completely the first time. This can be somewhat compensated by using good machinery.

iii. There is the problem of waste disposal. Toxic chemicals require a proper disposal service.

### 3.6.2 Safety

Since the work involves dangerous chemicals and power tools, we will need to take the necessary safety precautions:

i. Wear safety equipment during the whole process – gloves, protection glasses, and an apron.

ii. Work near an emergency eyewash station, a first aid box and a phone.

iii. Familiarize yourself with the proper use of all equipment and tools in the lab – if you are unsure of anything, ask a supervisor of the project.

### 3.6.3 Etching Process

Etching is the process of using acid to remove coppers that not need on the PCB (Printed Circuit Board). This acid is Acid Ferric Chloride III. Acid Ferric Chloride III is used to remove that coppers.

The steps of the etching process are:

i. Print the schematic onto photo paper and cut it with the same size of PCB board.

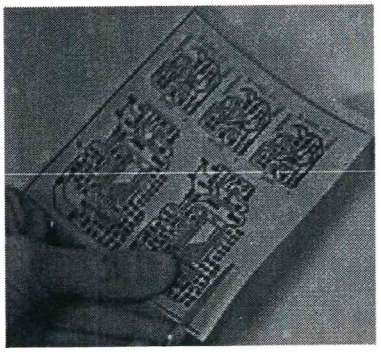


**Figure 3.6.3.1 Printed Schematic into Photo Paper**

ii. Stick the schematic diagram on PCB board.

iii. Paste the etching circuit onto photo paper with using Laminating Dry-Films machine. It's to make PCB paper joined with board.

iv. This is process takes about 1 minute.

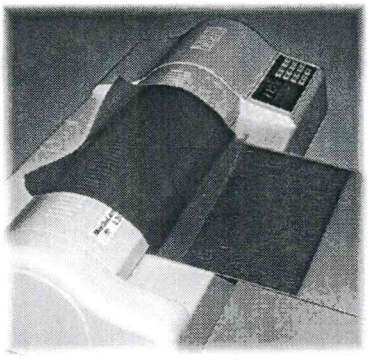


**Figure 3.6.3.2 Laminating Dry-Films Machine**

v. After that, remove the photo paper from board which has been incorporated in laminating Dry – Films machine before.

**Figure 3.6.3.3 Process to Remove Photo Paper**

vi. Dilute the copper was not used with a copper removal machine was prepared.

vii. Then, put the board into that machine to remove the useless copper.

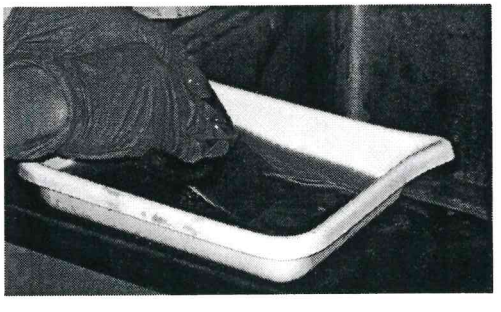


**Figure 3.6.3.4 Process to Remove Unused Copper**

viii. Then, use sand paper to rub the lines colors. In addition, detergent powder can also be used to remove the link. Next, just leave only the desired circuit PCB only.

## 3.7 Drilling Process

### 3.7.1 Material and Equipment:

- Bench clamp or support
- Dot punch or sharp tool
- Drilling machine or hand drill
- 1mm bits

### 3.7.2 Introduction of Drilling Process

After the etching process finished, the PCB will be punched using hand drilling machine. Hole is necessary to mount component (example: resistor, capacitor, inductor, tip 122, crystal, PIC base and etc.) before drilling, a dot punch is used to mark the hole position. This serves as a shallow guide for the drill bit to align easily while drilling. Any other sharp pointed tool can be used to do the marking. Points/eye drill used must be appropriate to the hole to be punched between 0.75 to 1.0 mm.

The purpose of this process is to facilitate the installation work on the circuit components of the PCB. During drilling, do not be pressed too strong because it may cause eye drill broken up and dangerous for the people around. Hold the drill steady and drill in straight slowly. The hole will be drilled with little force applied.

**Figure 3.7.2.1 Drilling Machine**

## 3.8 Insert the Component

Foot of component was inserted into the drilled hole that has been completed. It is easier if started with the low component first. Components that are installed must be inspected prior to use multi – meter to find out whether these components are in good condition or not. This process is quite important because we should insert the component correctly to avoid from circuit failure. Besides, some components have their own pole like diode, capacitor and other else. After finished the inserting process, we check it once again with the schematic to make sure all the component were at the position or holes.

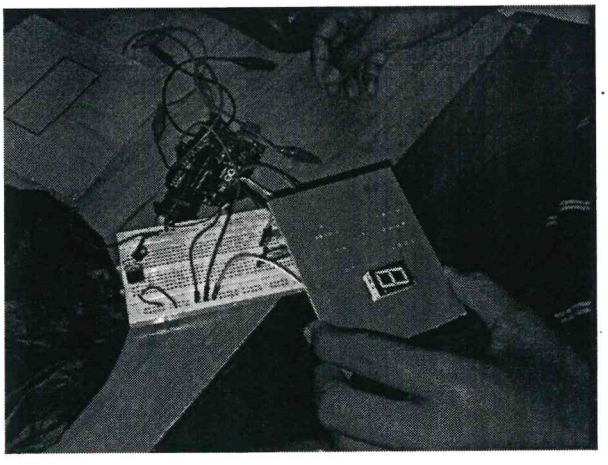


**Figure 3.8.1 Process Insert the Component**