



**PROJECT REPORT SMART CLASSROOM WITH IR BASED SENSOR**

**DIPLOMA IN ELECTRONIC ENGINEERING (COMMUNICATION)**

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**PSA**

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GANT CHART FOR PROJECT 1

GANT CHART FOR PROJECT 2

## **ABSTRACT**

Smart Classroom With IR Based Sensor and ARDUINO UNO is a system that was created to reduce power consumption and to study about power saving when sensors are used in this project. The sensor will control electricity supply by detecting the presence of in-room students during the lecture. Additionally, another function for this project is to control supply electricity. The objectives of this project are to reduce the waste of power to save the environment and save the cost of electric power for universities and taxpayers. If no appearance is detected, no output will go out and supply is still being turned off. ARDUINO UNO that will be used to connect hardware with LCD and electronic measurement functions. For the time being come, this system can be applied in lecture rooms, office houses and so on.

## **CHAPTER 1**

### **INTRODUCTION OF THE PROJECT**

## 1.1 INTRODUCTION

Smart Classroom is an electronic project that uses arduino. This project works to save electricity and to determine the number of students in a class. IR sensors are used to detect the presence of students through entrances and exits. There are 2 IR sensors for example IR sensor A and IR sensor B, if a student passes through the IR sensor A and IR sensor B will be count one. On the other hand if a student goes through the IR sensor B first then the IR sensor A will be rejected. The relay will turn off the light or fan when the number of students in the class is empty. This in turn can reduce the cost of electricity and easily de the total number of students in a class.

## 1.2 PROBLEM STATEMENT

Nowdays excessive and uncontrolled use of electricity have become one of the source of increasing monthly bill payments. This is why there is an initiative in improving the existing wiring system to more systematic and user-friendly. Today's switchgear switches are seen as the cause of user negligence resulting in an increase in electricity and unexpected events. Besides that, people start to find more easier or convenient solution in daily life. Electronic technology is popular nowadays because it is convenient, easier to construct and save cost. Then, they also can access to this system anytime. Moreover, this system is easy to build and configure.

### 1.3 OBJECTIVE

The objectives of the study will clearly state how the objectives of the study can be achieved. The objectives of this project are :

- ◆ Automatically take attendance from students using their IR sensor.
- ◆ Automatically control fan and light.
- ◆ Not wasting time.
- ◆ Save cost.

### 1.4 RESEARCH QUESTION

This study will answer the following research question :

- ◆ Do you think this product can save electric bill?
- ◆ Do you think this project will save you time to take attendance?
- ◆ Do you think this project is important in the university?
- ◆ Do you think we should do this project to facilitate your work?

## 1.5 SCOPE PROJECT

This system is built for university and user in Malaysia. Every building in Malaysia needs to implement this kind of system to saving electricity .

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### 2.1 INTRODUCTION

A literature review is a process of scientific research and previous studies have been done on an existing product but modification is requires to solve the problems and found in product. This research is such as studying the elements and materials used and procedures performed. The main purpose of this research the products consumer needs.

The method used is from the survey method, observation and research on the product. In addition, this research can be carried out by searching for information about the products through various sources such as surfing on internet, academic books and newspapers. Various forms of information are available and used for analysis and was chosen as the exact reference.

There is always a need to identify the major components required for the product. Our product mainly focuses on the automation. Based on the survey conducted, we thought of using Arduino UNO which triggers relay based on the motion of a human. Future add-ons to the product can make it as a complete independent working model. We have compared our system with different automation systems.

## 2.2 HARDWARE USE

### 1. Arduino UNO



**Arduino 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 worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

"Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of board.

<https://store.arduino.cc/usa/arduino-uno-rev3>

## 2. IR Sensor



This Infrared obstacle/object detection sensor is super easy to use. It comes with on board potentiometer to adjust the sensitivity. The output is digital signal so it is easy to interface with any microcontroller such as Arduino/Genuino UNO, Mega, Leonardo, Zero, 101, even the Raspberry Pi

or Raspberry Pi Zero. And of course it is also compatible with all other controller boards out there including CIKU, CT-UNO, CT-ARM, etc. This Infrared sensor offers simple, user friendly and fast obstacle detection via infrared reflection, it is non contact detection. As it is based on light reflection, the detection do vary with different surface. And any infrared source might also interfere the detection

It comes in a pair of Infrared emitter and receiver at the front of module, whenever there is object blocking the infrared source, it reflects the infrared and the receiver get it and the signal go through a comparator circuit on board. And depending on the threshold that being adjusted, it will output logic LOW at output pin and the green LED will light up to indicate the detection. Turning the on board potentiometer clock wise will increase the sensitivity and further increase the detection range. Compatible with 5V or 3.3V power input.

<https://my.cytron.io/p-infrared-sensor-module>

### 3. Light-Emitting Diode (LED)

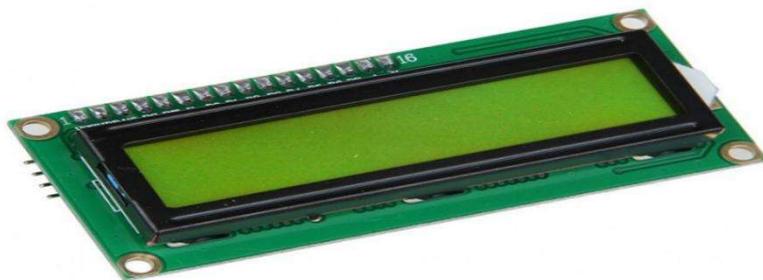


Light-emitting diode (LED) is a semiconductor device that emits light when an electric current is passed through it. Light is produced when the particles that carry the current (known as electrons and holes) combine together within the semiconductor material.

Since light is generated within the solid semiconductor material, LEDs are described as solid-state devices. The term solid-state lighting, which also encompasses organic LEDs (OLEDs), distinguishes this lighting technology from other sources that use heated filaments (incandescent and tungsten halogen lamps) or gas discharge (fluorescent lamps).

<https://www.ledsmagazine.com/leds-ssl-design/materials/article/16701292/what-is-an-led>

#### 4. LCD Display



LCD (Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation. LEDs have a large and varying set of use cases for

consumers and businesses, as they can be commonly found in smartphones, televisions, computer monitors and instrument panels.

LCDs were a big leap in terms of the technology they replaced, which include light-emitting diode (LED) and gas-plasma displays. LCDs allowed displays to be much thinner than cathode ray tube (CRT) technology. LCDs consume much less power than LED and gas-display displays because they work on the principle of blocking light rather than emitting it. Where an LED emits light, the liquid crystals in an LCD produces an image using a backlight

<https://whatis.techtarget.com/definition/LCD-liquid-crystal-display>

### 2.3 COMPARISON OF STUDY

	Smart Classroom with IR Based Sensor	Automatic Control of Power Supply in Classroom	Smart Home
--	--	--	---------------

Function	Can secure electric waste	Can operated manually switch on/off light	Can ultimate control over home by automating
Circuit	Arduino UNO	Power Supply and Arduino	Arduino UNO
Buzzer	Unused	Used	Unused
Range	5cm to 10m	10cm to 20m	Bluetooth less than 100 meters

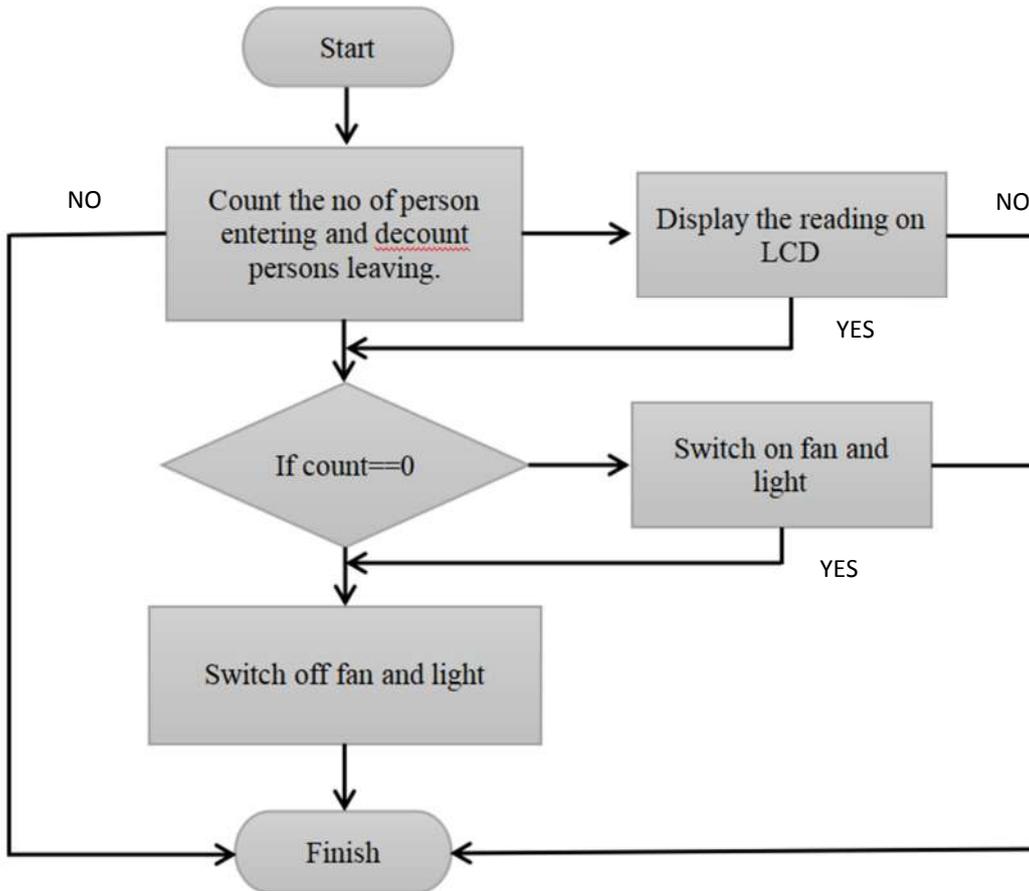
## **CHAPTER 3**

### **METHODOLOGY**

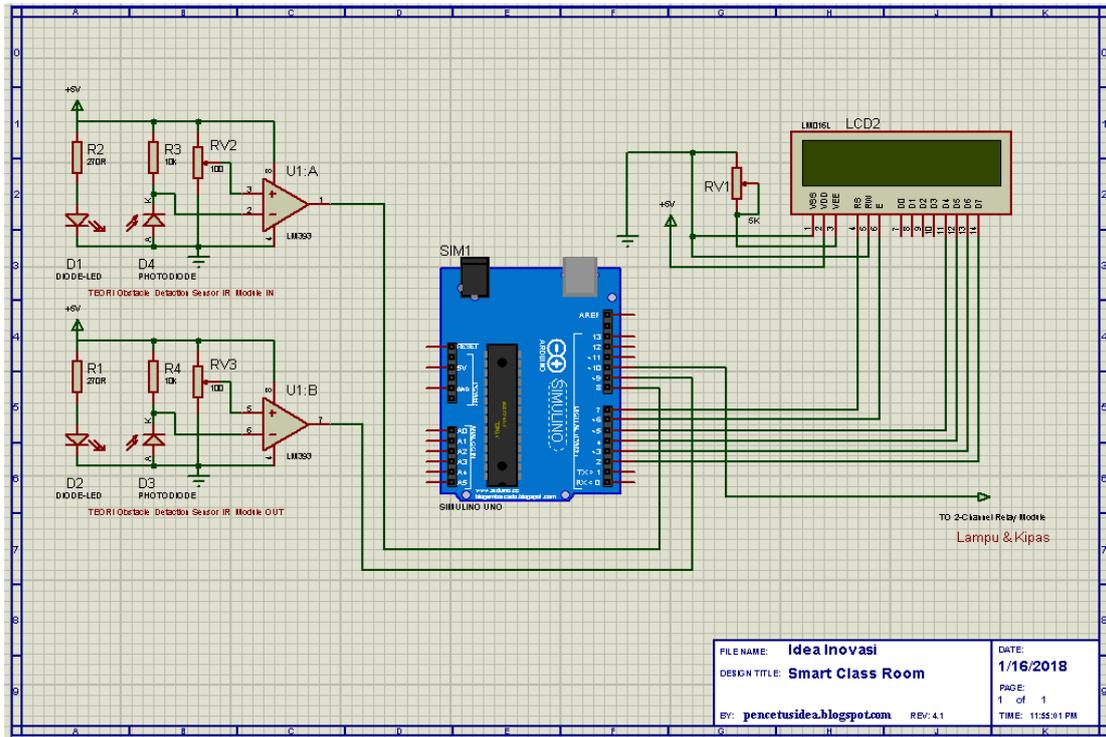
#### **3.1 INTRODUCTION**

This chapter explain on the methodology that implement in this project. There are several methods or procedures that available to create project formulation. The methodology will explains the flow chat and Block Diagram.

#### **3.2 FLOW CHART**



### 3.3 SCHEMATIC DIAGRAM



### 3.4 ESTIMATE PRICE

No	Item	Quantity	Price
1	Arduino UNO R3	1	RM31
2	LCD 16x2	1	RM9
3	Infrared Sensor	2	RM6
4	DC Fan	1	RM5
5	DC Lampu Led	1	RM7
6	Adaptor 12V	1	RM20
7	Plastic waterproof electronic Project Box	1	RM15
8	Others (Programming and accessories)	6	RM307

		TOTAL	RM400
--	--	-------	-------

## **CHAPTER 4**

### **RESULT AND ANALYSIS**

#### 4.1 INTRODUCTION

This chapter is model that have been described in chapter 4 to give explanations and give description for the result that have been tested by most of student in the institute.

The chapter will give result about how the SMART CLASSROOM WITH IR BASED SENSOR works and how the society response toward this project.

#### 4.2 SURVEY (QUESTIONNAIRE)

1. What is your gender ?

**PIE CHART**

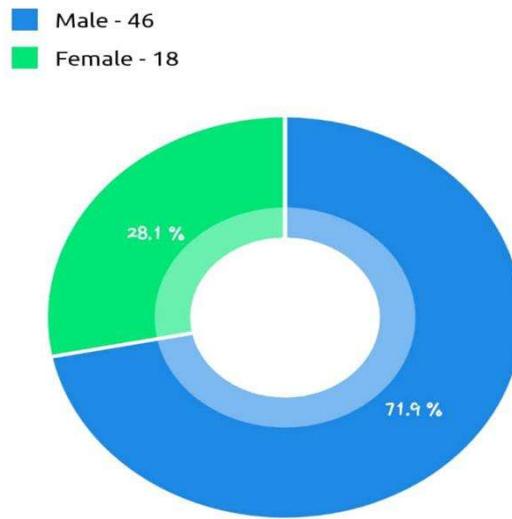


FIGURE 4.1

2. What is your age ?

**PIE CHART**

- 10-19 - 19
- 20-39 - 29
- 30-39 - 13
- 40-49 - 2
- Above 50 - 1

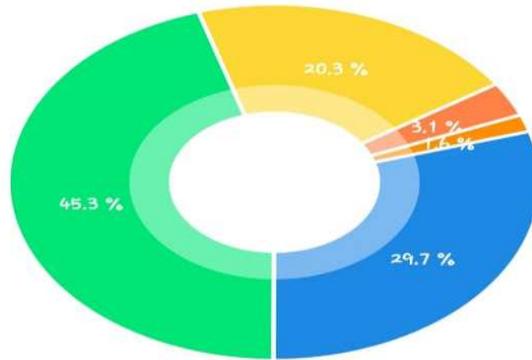


FIGURE 4.2

3. Have you heard about Smart Classroom with IR Based Sensor

**PIE CHART**

- Yes - 52
- No - 8
- Maybe - 4

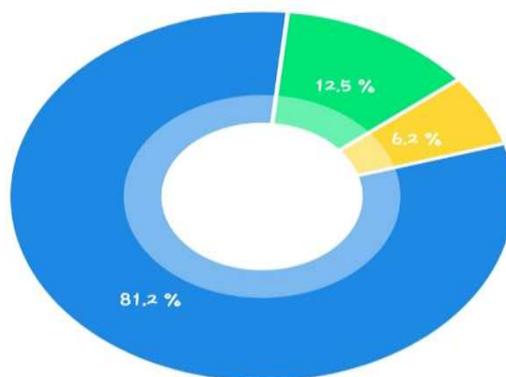


FIGURE 4.3

4. Do you think this project is important in the university ?

PIE CHART

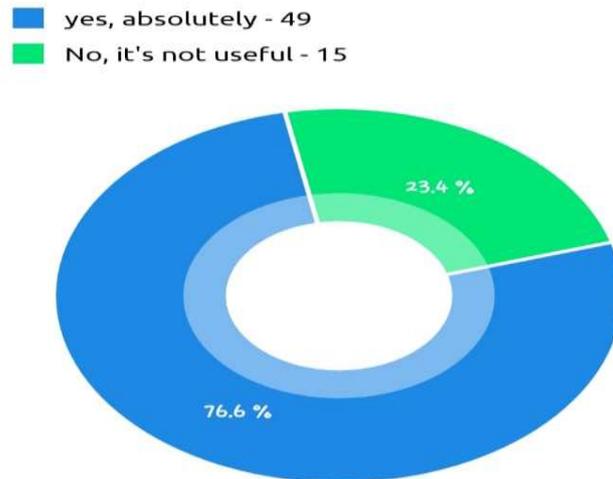


FIGURE 4.4

5. Do you think this product can save electric bill ?

**PIE CHART**

■ Yes - 31  
■ No - 22  
■ Maybe - 11

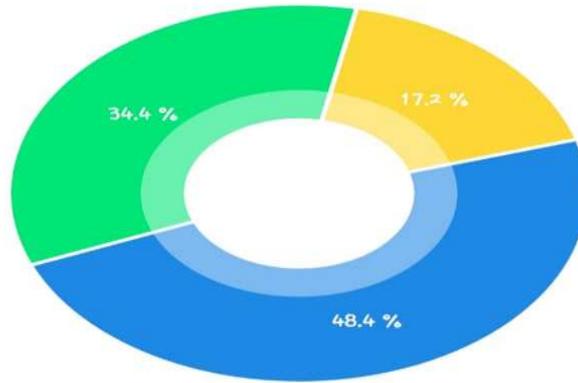


FIGURE 4.5

6. Do you agree if a smart classroom is designed and placed at every place of study such as schools and universities ?

**PIE CHART**

■ Yes - 48  
■ No - 10  
■ Maybe - 6



FIGURE 4.6

7. Do you think this project will save you time to take attendance ?

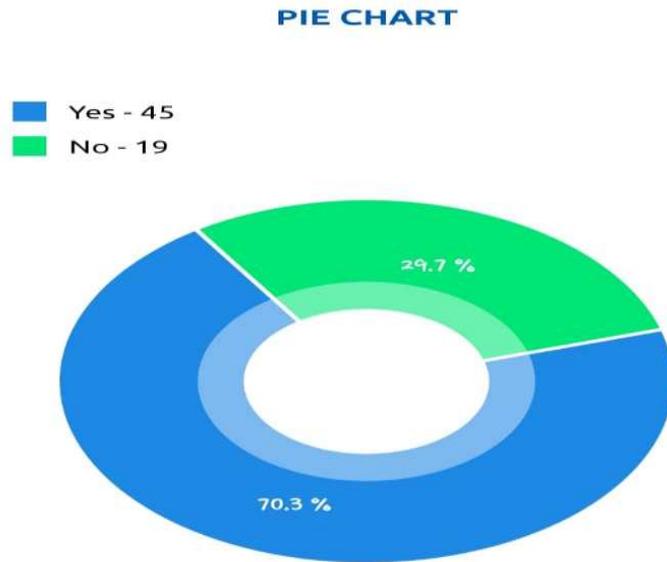


FIGURE 4.7

8. Do you think we should do this project to facillitate your work ?

## PIE CHART

■ Yes - 34  
■ No - 10  
■ Maybe - 20



FIGURE 4.8

### 4.3 CODING FOR SYSTEM

```
#include <LiquidCrystal.h>
```

```
#define IR1 8
```

```
#define IR2 9
```

```
#define RLY1 10
```



```

lcd.setCursor(0, 1);

lcd.print("NOW COUNT: ");

lcd.setCursor(12, 1);

lcd.print(Counter);

}

void loop() {

//*****CHECK IT SENCOR
IN*****

if (digitalRead(IR1)==0)

if (digitalRead(IR1)||digitalRead(IR2) == false){

do{

    INSens = digitalRead(IR1)&&digitalRead(IR2);

    }

while (INSens == false);

Counter = Counter+1;

delay(1);

```

```

}

//*****CHECK IT SENSOR
OUT*****

OUTSens = digitalRead(IR1);
if (digitalRead(IR1)== false){
do{

    OUTSens = digitalRead(IR1);

}

while (OUTSens == false);

if (Counter > 0){
Counter = Counter-1;

delay(1);

}

//*****
*****

}

if (Counter >= 1){

digitalWrite(RLY1,HIGH);

}

```

```
if (Counter < 1){  
    digitalWrite(RLY1,LOW);  
  
    }  
    lcd.begin(16, 2);  
    lcd.clear();  
    lcd.setCursor(0, 0);  
    lcd.print("CONTROLLER DEVICE");  
  
    lcd.setCursor(0, 1);  
    lcd.print("NOW COUNT: ");  
    lcd.setCursor(12, 1);  
    lcd.print(Counter);  
    delay(200);  
  
}
```

#### 4.4 OUTPUT PROJECT

Step 1 : The IR sensor detect a light within 5 centimeters.



Step 2 : After that, LCD displays the input received through the IR sensor.



Step 3 : And then, light and fan turns ON



## **CHAPTER 5**

### **CONCLUSION & RECOMMENDATION**

#### **5.1 INFRARED SENSOR RESEARCH**

Infrared radiation is an electromagnetic wave with wavelength of 700nm to 1 mm. It is emitted by objects with temperature above 0 kelvin. Furthermore intensity and wavelength of infrared radiation depends on the temperature of the object.

The infrared sensors are the sensors that detect/measure infrared radiation or change in the radiation from outer source source or inbuilt source. Also sensors that uses the property of infrared radiations to detect the changes in surrounding are termed as infrared sensors.

Active infrared sensors are the types of infrared sensor that emit infrared radiation which is later received by the receiver. The IR is emitted by a IR Light Emitting Diode (LED) and received by photodiode, phototransistor or photoelectric cells. During the process of detection, the radiation is altered, between process of emission and receiving, by object of interest. The alteration of radiation causes change in received radiation in the receiver. This property is used to generate desired output with help of associated electronic circuit.

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared (IR) light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. PIR sensors are commonly used in security alarms and automatic lighting applications. PIR sensors detect general movement, but do not give information on who or what moved. For that purpose, an active IR sensor is required.

## 5.2 CONCLUSION

What i concluded from the project was that theory and practical life is something different. We need apply that theory in our practical life for better and effective result. Based on the Google Form questionnaire, people agreed that the device will help the communities. Next, this device will able to avoid the widespread waste of electricity in our country.

## 5.3 RECOMMENDATION

After completing the ‘SMART CLASSROOM WITH IR BASED SENSOR’ Project. We can formulate and portray some of our suggestions and views after looking at the

results. In the future, improvement can be made by switching sensor like Digital Infrared Sensor because these sensors can detect distances much farther than IR sensor.

## 6.0 REFFERENCE

1. <https://store.arduino.cc/usa/arduino-uno-rev3>
2. <https://my.cytron.io/p-infrared-sensor-module>
3. <https://whatis.techtarget.com/definition/LCD-liquid-crystal-display>
4. <https://www.ledsmagazine.com/leds-ssl-design/materials/article/16701292/what-is-an-led>

## 7.0 APPENDIX

Gant chart for project 1

	W 1	W 2	W 3	W 4	W 5	W 6	W 7	W 8	W 9	W1 0	W1 1	W1 2	W1 3	W1 4	W1 5
What is															

research															
Propose suitable topic and submit project proposal form															
Prepared proposal report															
Research writing															
Prepare literature review															
Research methodology and design															
Presentation															
Submit report															



• Schedule



• Actual

Gant chart for projet 2

	W	W	W	W	W	W	W	W	W	W	W1	W1	W1	W1	W1	W1
--	---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----

	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
Buying component	Red	Red													
	Yellow	Yellow													
Project design			Red	Red											
			Yellow	Yellow	Yellow	Yellow									
Producing project				Red	Red										
					Yellow										
Work in progress					Red	Red									
					Yellow	Yellow									
Run and testing project						Red	Red	Red							
							Yellow	Yellow							
Modification of project								Red	Red						
								Yellow	Yellow						
Data analysis project										Red	Red	Red			
										Yellow	Yellow	Yellow			
Report preparation											Red	Red	Red		
											Yellow	Yellow	Yellow	Yellow	
Presentation													Red	Red	
												Yellow	Yellow	Yellow	
Submit report															Red
															Yellow



• Schedule



• Actual