

REPORT PROJECT

SMART MOVING FAN

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SUBMISSION OF THIS REPORT IS TO FULFILL
THE REQUIREMENT FOR CERTIFICATE OF
ELECTRONIC ENGINEERING (COMPUTER) AT THE
DEPARTMENT OF ELECTRICAL ENGINEERING
SEBERANG PERAI POLYTECHNIC

JUNE 2017

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ABSTRACT

This paper presents a theoretical model and a system concept to provide an effective solution for elderly people who have difficulty to move. This model works in a way where it to help reducing the cost of buying multiple common home standing fan and to help elderly people who have difficulty to move. Usually lots of fans need to be bought for every house space and hall to cool the user, this appliance move according to the user's phone Bluetooth connection by remote control along the tracks that will be placed on the floor in the user's house. With this, the cost of electricity is reduced with only one fan used to cool each user. This appliance use (lithium ion) battery to power the microprocessor and to power the fan. The results that we obtained is a failure due to external and unknown factor. The overall project fabrication was done but it is not functional as programmed.

ABSTRAK

Model ini bertujuan untuk mengurangkan penggunaan elektrik. 'Kipas Bergerak Pintar' adalah sebuah alat yang akan dicipta untuk membantu mengurangkan kos pembelian kipas berdiri biasa dan membantu warga tua yang mempunyai kebatasan untuk bergerak. Oleh kerana biasanya banyak kipas perlu dibeli untuk setiap ruang rumah untuk menyejukkan penggunaannya, alat ini bergerak dengan alat kawalan jauh melalui trek yang akan diletakkan di ruang-ruang di dalam rumah pengguna. Dengan ini, kos elektrik dapat dijimatkan dengan hanya menggunakan sebiji kipas untuk setiap pengguna. Alat ini menggunakan battery litihium ion untuk menghidupkan mikroprocessor di dalam litar dan untuk menggerakkan kipas. Hasil yang kami dapat daripada penghasilan projek ini adalah gagal kerana factor luaran dan ralat yang tidak dapat dikenalpasti. Penghasilan keseluruhan projek ini telah siap tetapi ianya tidak berfungsi seperti yang diprogramkan.

ACKNOWLEDGEMENT

First and foremost I would like to take this opportunity to express my gratitude to everyone who supported me throughout the course of this project. I would like to say a gratitude to our supportive supervisor, Mr. Hamadi B. Ahmad for his aspiring guidance, invaluable constructive criticism and friendly advice during the project work. A sincerely grateful to him for sharing his truthful and illuminating views on a number of issues related to the project. Other than that, I would like to express gratitude towards my parents, and my colleague for kind encouragement, co-operation and their willingness to help me out which help better in completion of this project. It would not have been possible without the kind support and help of many individuals and organizations. I would like to extend our sincere thanks to all of them.

APPRECIATION

We are very thankful to Madam Masliza binti Maskin for her kindness, thoughtful, patiently for guiding us. Madam was always supported us, teach us, give a good cooperation at all times, and also a great advisor for us from beginning project until end of the project. Thanks God for using her to touch my life, may Madam Masliza forever remain in God's blessings and may continue to be a light in people lives. Appreciate also goes to Mr.Hamadi that willing to help us to solve, check, manage our circuit to get the precisely results. Kindness is a language which the dumb can speak, the deaf can understand. He will be rewarded thanks. Of course, do not forget to parents who support, spend time and involve to complete the project. Lastly I would like to thank to lecturers Department of Electrical Engineering.

PROJECT REPORT CONFIRMATION

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

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CHAPTER 1

INTRODUCTION

This project is mainly explains the theory of creating a moving fan and according to that we came up with an idea of creating the normal fan can move around with controlled by users using remote control. Remote control is used to control the fan movement and the fan speed. This moving fan is useful for user who do no have the ability to walk or wakeup from the bed like the elderly and disabled limbs because this fan no need to switch on the plug just only need to controlled. This intelligent fan uses remote control to move the fan movement and speed as users need no matter how long distance. It will move from one place to other place by controlled from user. This fan is installed with a small motor and lithium ion battery to move when remote is controlled by user. So by using the motor and battery the fan can move from origin place to other place. This fan also uses sensor to detect the places that it cannot entered and with this sensor the fan also can avoid from violate the other object such as wall, toy and so on. One major problem we are undergoing is infrared sensor based problems. Moreover, we also hope that our project might give a hand during emergencies time. For instance, this project will be very useful. By this, elderly people and disabled limbs can get the cool air without switch on the fan and can turn off the fan with no need the help from another people.

1.1 PROBLEM STATEMENT

- It's is difficult situation or stage for user who do not have the ability to walk or wakeup from the bed like the elderly and disabled limbs.
- This intelligent fan uses remote control to move the fan movement

1.2 PROJECT OBJECTIVE

Smart Moving Fan completes the requirements for our project objectives

- ❖ To build a fan with automatic moveable base
- ❖ To implement radio frequency transmitter and receiver into the project
- ❖ To elderly people who unable to walk and disable limbs.

1.3 PROJECT BACKGROUND

For final year project, we decide to make a SMART MOVING FAN. It is a simple yet good concept. By using this method, to make elderly people who unable to walk and disable limbs easy to use fan without make them suffer to on and off fan. Then, its portable we can bring anywhere we can, we can use all the time.

1.4 PROJECT SCOPE

In execution of a project, it must have a particular scope to ensure the project can be carried out as planned and accordance with what you want to reach. So, here is the scopes set for the “Smart Moving Fan”.

- Search detail about Smart Moving Fan and then, ask to the lecture’s opinion about it.
- Identify correctly and list down all the components to avoid from buying the wrong components.
- Help people during emergency during dark or even find missing things.
- Do some research about Smart Moving Fan and also learn more about it so it will easier to make the project.

1.5 IMPORTANCE AND IMPACT OF PROJECT

The importance of this project is to help people main for those who are old and also especially disable limbs people. The impact that we will receive is it will help to bring a change in each and everyone’s life. We will also try to aid them in a way where they need fan during hot weather time especially when they need oxygen. Certain people who really will suffer without fan during hot weather and then they not comfortable with sweat. So when this happens this moving portable fan will help them to use for when they want. Furthermore, it is easy to carry all the places.

1.6 SUMMARY

We have chosen this project in a thought of it will bring advantage to people who really need it and this will also give them to get the thing they want. Since semester 1 to semester 4 we have learned a lot of coding and also practical. We feel that all this while what we have been learning will be utilized fully and it will help us to do the project well. By doing this project , it actually helped us to think out of the box especially from the view of pros and cons of this project. It also helped us to analyses what are the problem we might see just to make the project perfect.

We have learnt what are the things we should use to build this project just to make it in to a success. We have also learnt what kind of pros and cons we can observe through the analyzation when we were doing our final proposal.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

A literature review is a text that reviews the points of knowledge on a particular topic. Literature reviews are part of secondary sources and are based on original experimented work.

This literature reviews are always based or associated with academic oriented literature such as a thesis. This reviews always has an own research proposal as well as its final results in the end. Its main purpose is to keep the readers up to date on a topic which can be used for future research. A well-structured literature review must be consists of current and relevant references with consistent, appropriate referencing style and use of proper terminology and view of previous researches on a specific topic. This flow of ideas must be in order to fulfill the requirement.

Through the literature study, we should be able to obtain the type of material, design and components, framework installation, installation method, required maintenance and proper project size for any specific topic. This work design and study involving problem solving activity is known as literature study. This would ensure that there will be no problem during the completion or presentation of the project.

2.1 Previous Research

2.1.1 Transmitter

A transmitter can be a separate piece of electronic equipment, or an electrical circuit within another electronic device. A transmitter and a receiver combined in one unit is called a transceiver. The term transmitter is often abbreviated "XMTR" or "TX" in technical documents. The purpose of most transmitters is radio communication of information over a distance. The information is provided to the transmitter in the form of an electronic signal, such as an audio (sound) signal from a microphone, a video (TV) signal from a video camera, or in wireless networking devices a digital signal from a computer.

The transmitter combines the information signal to be carried with the radio frequency signal which generates the radio waves, which is called the carrier signal. This process is called modulation. The information can be added to the carrier in several different ways, in different types of transmitters. In an amplitude modulation (AM) transmitter, the information is added to the radio signal by varying its amplitude. In a frequency modulation (FM) transmitter, it is added by varying the radio signal's frequency slightly.

The antenna may be enclosed inside the case or attached to the outside of the transmitter, as in portable devices such as cell phones, walkie-talkies, and garage door openers. In more powerful transmitters, the antenna may be located on top of a building or on a separate tower, and connected to the transmitter by a feed line, that is a transmission line.

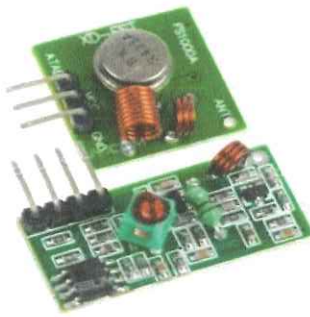


Figure 2.1 Transmitter

2.1.2 Receiver

An RF receiver module receives the modulated RF signal, and demodulates it. There are two types of RF receiver modules: super heterodyne receivers and super-regenerative receivers. Super-regenerative modules are usually low cost and low power designs using a series of amplifiers to extract modulated data from a carrier wave. Super-regenerative modules are generally imprecise as their frequency of operation varies considerably with temperature and power supply voltage. Super heterodyne receivers have a performance advantage over super-regenerative; they offer increased accuracy and stability over a large voltage and temperature range. This stability comes from a fixed crystal design which in turn leads to a comparatively more expensive product.

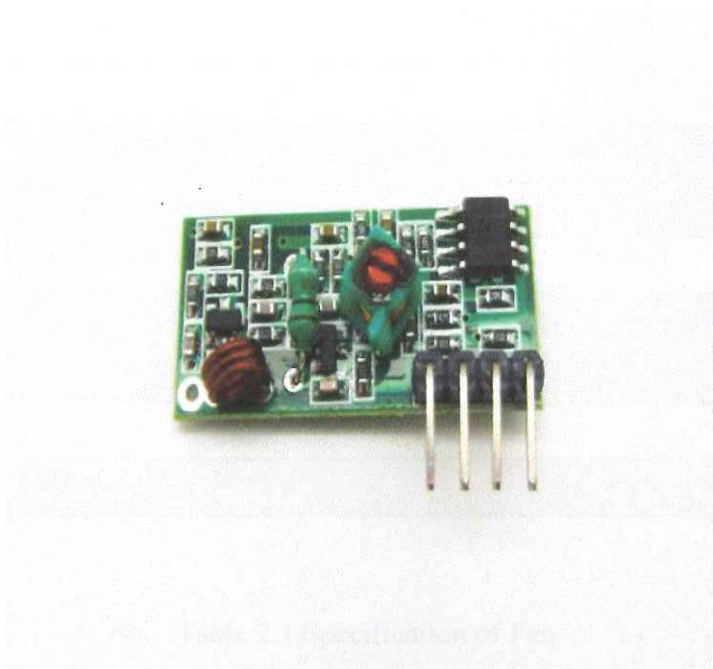


Figure 2.2 Receiver

2.1.4 Li-ion Fan

Li-ion battery will produce the output power: 4W, energy-saving and environmentally-friendly, with long runtime over 6 hours; Multi-functional circuit integration design including three gears shift circuit, charging circuit and protection circuit; Small size, portable and convenient to use; With ABS shell, thickness, solid; Popular with travelers and students; Can be charged via home power supply, computer, cell phone, power bank or car charger.

For cool fan service time: approx. 6 hours for gear 1 (min. gear), Charge stand: 6 hours' charging time.

Specification	
Interface	All devices with Micro USB port such as Samsung, Xiamoi, Meizu, HTC, ZTE, Huawei, Lenovo and etc, USB 2.0
Powered by	18650 Li-ion battery, USB
Fan blades quantity	4
Fan mode	3
Fan rotate angle	Left to right

Table 2.1 Specification of Fan



Figure 2.3 Example of Li-ion Fan

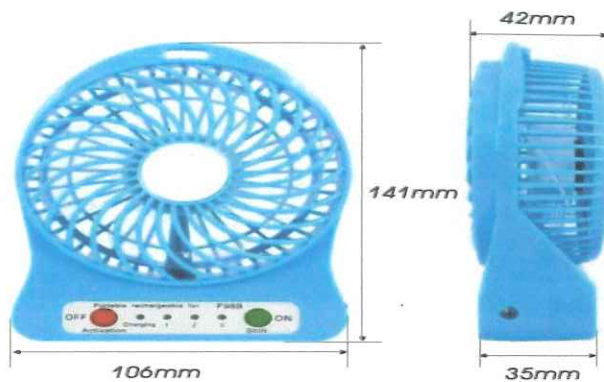


Figure 2.4 Example dimension of Li-ion Fan

2.1.5 DC Motor

A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor. Most types produce rotary motion; a linear motor directly produces force and motion in a straight line.

DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances. Larger DC motors are used in propulsion of electric vehicles, elevator and hoists, or in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.

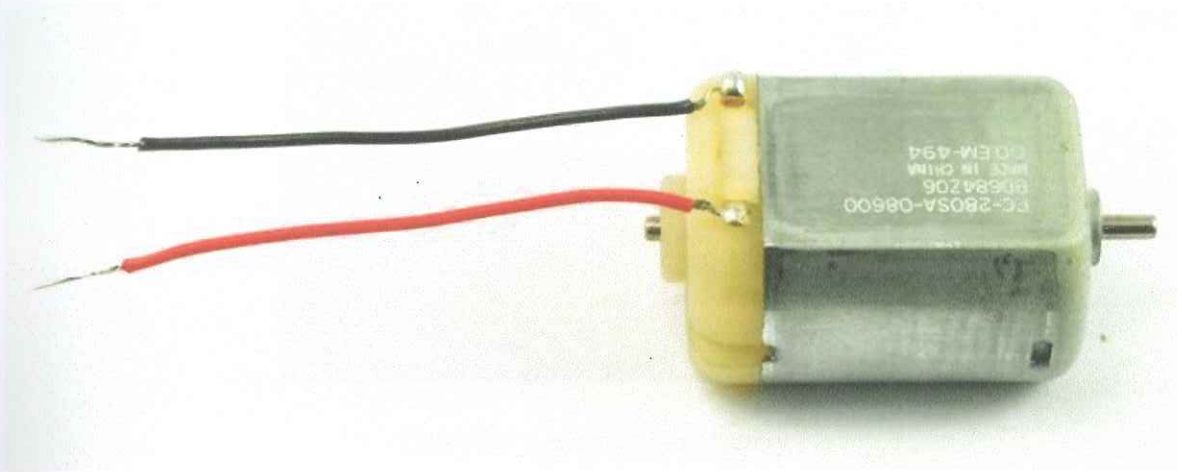


Figure 2.5 Example of DC Motor

2.1.6 Li-ion rechargerable battery

A rechargeable battery, storage battery, secondary cell, or accumulator is a type of electrical battery which can be charged, discharged into a load, and recharged many times, while a non-rechargeable or primary battery is supplied fully charged, and discarded once discharged. It is composed of one or more electrochemical cells. The term "accumulator" is used as it accumulates and stores energy through a reversible electrochemical reaction. Rechargeable batteries are produced in many different shapes and sizes, ranging from button cells to megawatt systems connected to stabilize an electrical distribution network. Several different combinations of electrode materials and electrolytes are used, including lead-acid, nickel cadmium (NiCd), nickel metal hydride (NiMH), lithium ion (Li-ion), and lithium ion polymer (Li-ion polymer).

Rechargeable batteries typically initially cost more than disposable batteries, but have a much lower total cost of ownership and environmental impact, as they can be recharged inexpensively many times before they need replacing. Some rechargeable battery types are available in the same sizes and voltages as disposable types, and can be used interchangeably with them.



Figure 2.6 Example Li-ion battery

2.1.7 Arduino Uno

Arduino Uno is a microcontroller board based on the ATmega328P (Data sheet). It has 14 digital input, output pins, 6 analog inputs, 916 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It is easy component to install our program code to paste in our project rather than suffer by connect through laptop and our project. It is easy to use, portable, less weight.

2.1.8 Wheel

This is the wheel we using for our project. This is the wheel also we used for our Sumo Robot project which in project 1. It's will work how we control by using remote control. the wheel will move front, back and turn left to right. It is made of rubber. Make sure that the wheels supports the fan to carry around easily.

CHAPTER 3

METHODOLOGY

This chapter is regarding about how the project was completed successfully. This project was planned first by having a session of brainstorming and from that we were able to find information from various types of sources such as internet, article, videos , journal and many more. There was a regular meet up with the supervisor to seek for her advice. The supervisor gave us a guideline on how to do the project and also helped us to complete it in time. It was worth it because we were able to obtain a good result.

3.1.1 Introduction

For this project, transmitter and receiver device is being used so that it can be used in remote control since its being easier to be controlled Furthermore, we have to build a fan with automatic moveable base to elderly people who unable to walk and disable limbs. Moreover, the use of efficient codes for better and faster response time. The impact that we will receive is it will help to bring a change in each and everyone's life. We will also try to aid them in a way where they need fan during hot weather time especially when they need oxygen.

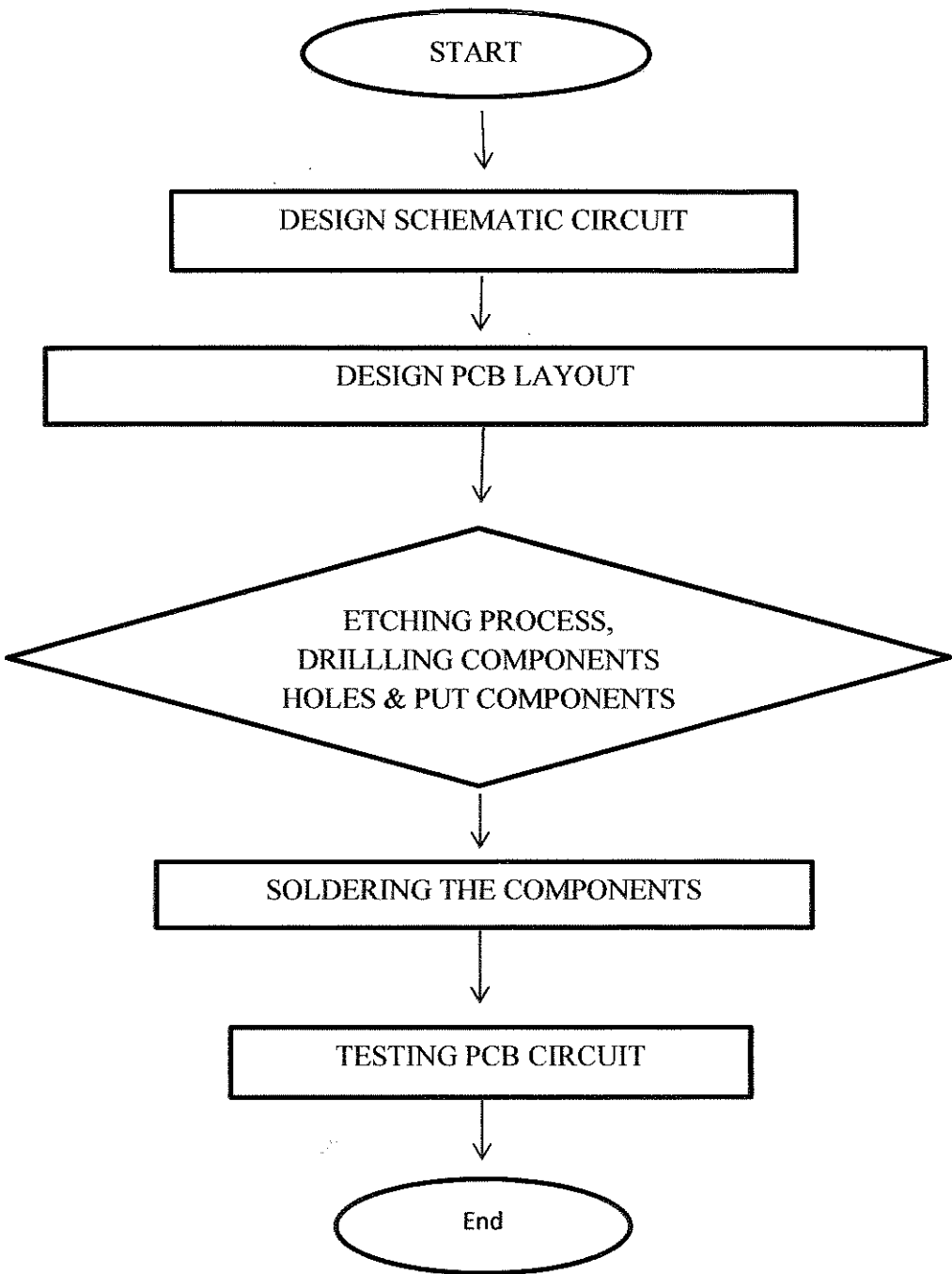


Figure 3.1 **Flowchart Of Project**

Summary of the flow chart

We have our own target for the completion of this project and we have done some advance planning before starting this project. By doing this flow chart as shown above, shows our plan or target step by step in making this project. A flow chart have been created for smooth project start off to ensure the problems solved take place following procedure step by step. The flow chart will be used in further analysing, designing and management of process or improving the overall program.

Among the item that listed are need to be used and looking for ideas to design the great project and also designing the exact circuit. Furthermore, we also estimated the cost of the project, cost of each components and also overall of the project. The circuit testing is performed to ensure that the system function properly.

Find the idea and specify the type of the Project

After receiving a briefing from the Chief Coordinator of the Project, we had a discussion and some planning together to create the useful project to society and especially for engineering students. We planning to come out the great project for engineering student but also can be used by other students, which is the project can gives many benefits for students, enhances the knowledge and improving the skills for the engineering students. Next, with the help of our supervisor, we had planning to nominate a suitable title for our project. The purpose of the discussion was done to facilitate the further implementation of our project in order to complete this project within the stipulated time. Here are some of the procedures need to be considered:

- Duration to complete the project
- Access to components
- Estimated costs of the project
- The relationship between the theory and practical

3.1.2 Introduction of software

3.2.1 Introduction of Proteus Software

PROTEUS 8 is a simulation and design software tool developed by Labcenter Electronics for Electrical and Electronic circuit design. It also possess 2D CAD drawing feature. It is a software suite containing schematic, simulation as well as PCB designing. ISIS is the software used to draw schematics and simulate the circuits in real time. The simulation allows human access during run time, thus providing real time simulation. ARES is used for PCB designing. It has the feature of viewing output in 3D view of the designed PCB along with components. The designer can also develop 2D drawings for the product.

3.2.2 Features of proteus software

ISIS has wide range of components in its library. It has sources, signal generators, measurement and analysis tools like oscilloscope, voltmeter, ammeter etc., probes for real time monitoring of the parameters of the circuit, switches, displays, loads like motors and lamps, discrete components like resistors, capacitors, inductors, transformers, digital and analog Integrated circuits, semi-conductor switches, relays, microcontrollers, processors, sensors etc.

ARES offers PCB designing up to 14 inner layers, with surface mount and through hole packages. It is embedded with the foot prints of different category of components like ICs, transistors, headers, connectors and other discrete components. It offers Auto routing and manual routing options to the PCB Designer. The schematic drawn in the ISIS can be directly transferred ARES.

3.2.3 Steps of “Starting New Design” in proteus 8

Step 1: Open ISIS software and select New design in File menu

Step 2: A dialogue box appears to save the current design. However, we are creating a new design file so you can click Yes or No depending on the content of the present file. Then a Pop-Up appears asking to select the template. It is similar to selecting the paper size while printing. For now select default or according to the layout size of the circuit.

Step 3: An untitled design sheet will be opened, save it according to your wish, it is better to create a new folder for every layout as it generates other files supporting your design. However, it is not mandatory.

Step 4: To Select components, Click on the component mode button.

Step 5: Click On Pick from Libraries. It shows the categories of components available and a search option to enter the part name.

Step 6: Select the components from categories or type the part name in Keywords text box.

Step 7: The selected components will appear in the devices list. Select the component and place it in the design sheet by left-click.

*Place all the required components and route the wires i.e, make connections. Either selection mode above the component mode or component mode allows to connect through wires. Left click from one terminal to other to make connection. Double right-click on the connected wire or the component to remove connection or the component respectively. Double click on the component to edit the properties of the components and click on Ok.

Step 8: After connecting the circuit, click on the play button to run the simulation. Simulation can be stepped, paused or stopped at any time.

The proteus 8 software

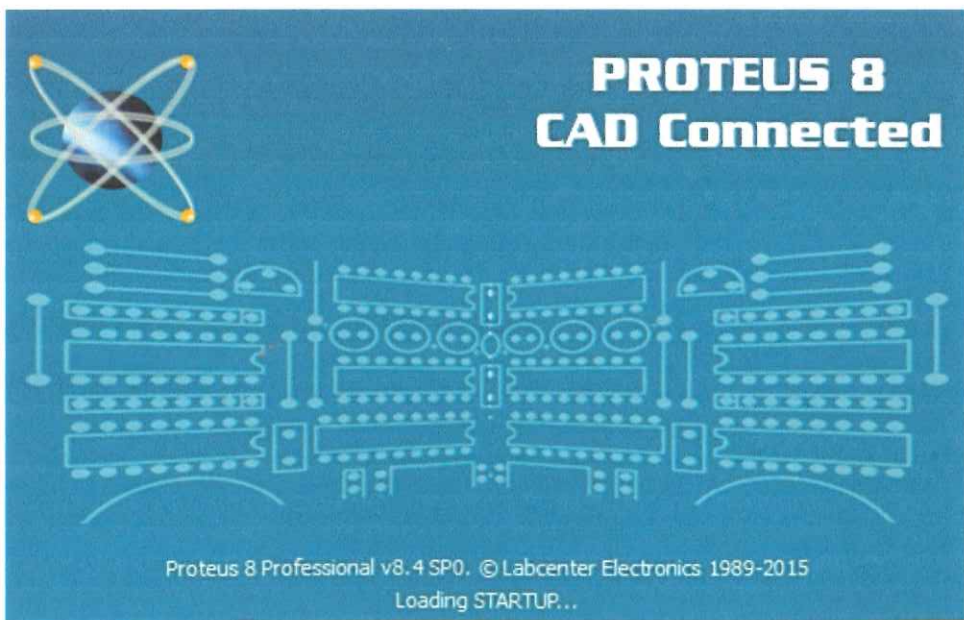


Figure 3.2

3.2.4 Process of making PCB Wizard

Method of making power supply there is many step by step need to achieve the process such as print out the circuit, implementation, PCB mount using UV light, process of developer, process of etching, process of soldering and process of drill the PCB to make the hole to the components.

Print out the circuit by using PCB Wizard

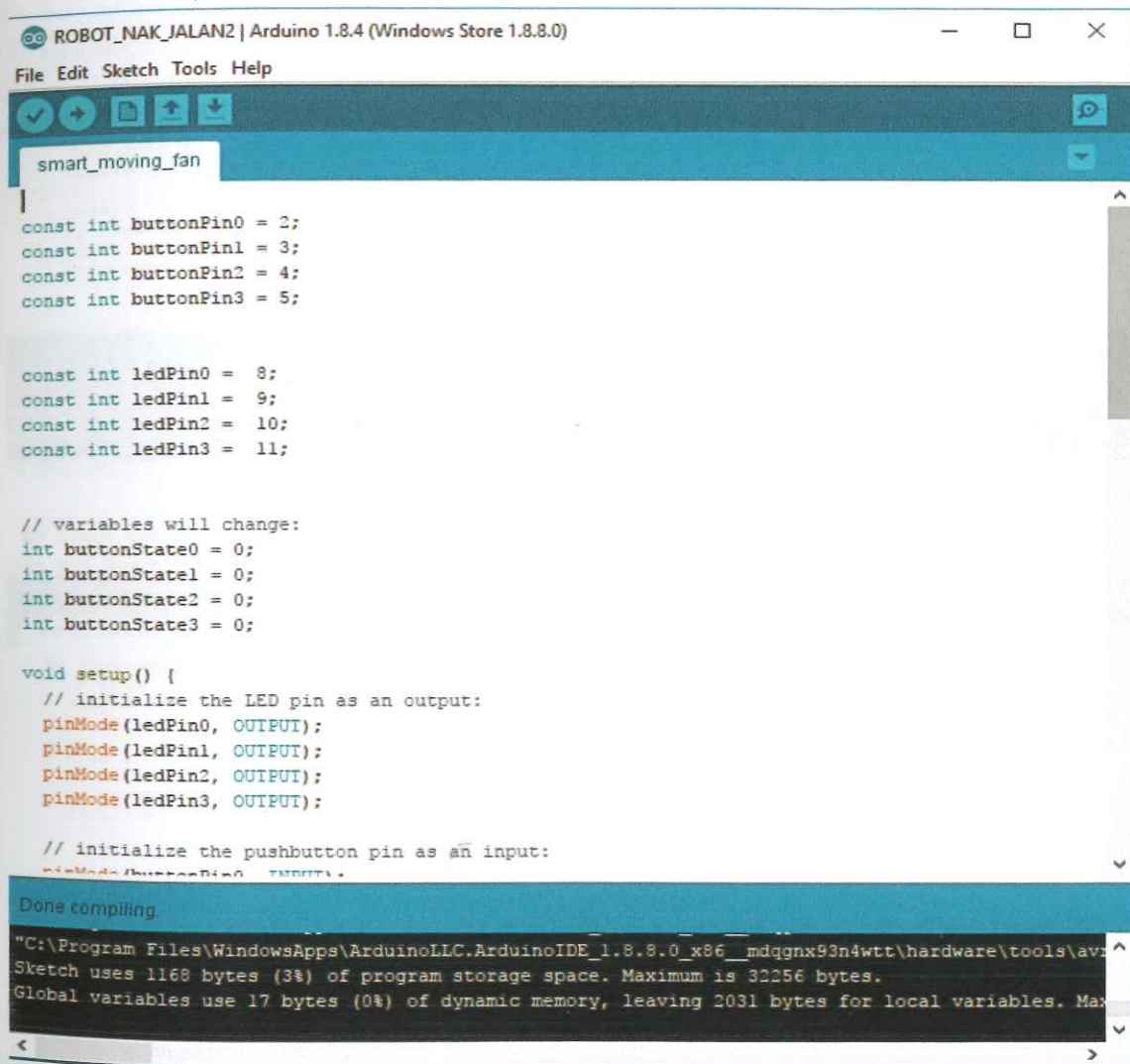
The process of drawing printed circuit by using the PCB Wizard. It must draw with caution because if there is any small mistakes, it will effect overall the operation of circuit. After obtaining the schematic circuit, then it must converted to a printed circuit before being transferred to be printed circuit board. Printed circuit board consists of a good layer conductor of copper and layer of insulating materials. In accordance with diagrams, rough-made circuit design prior to actual circuit drawn on a printed circuit board to avoid any short circuit. Printed circuit sketch should be drawn in actual size so that the components can be sorted and arranged neatly. Each components can be used in select in software PCB Wizard.

To draw a printed circuit, there is a few guidelines need to be followed:

- The distance between the components with one to another component is not too close and not too far also
- Used an appropriate measure of size and the components that are used.
- Designed and arrangement of the printed circuit preferably.

3.2.5 Arduino Software

Software to write code is Arduino which has written in C language. Below is the code to for this system :



```
ROBOT_NAK_JALAN2 | Arduino 1.8.4 (Windows Store 1.8.8.0)
File Edit Sketch Tools Help
smart_moving_fan
const int buttonPin0 = 2;
const int buttonPin1 = 3;
const int buttonPin2 = 4;
const int buttonPin3 = 5;

const int ledPin0 = 8;
const int ledPin1 = 9;
const int ledPin2 = 10;
const int ledPin3 = 11;

// variables will change:
int buttonState0 = 0;
int buttonState1 = 0;
int buttonState2 = 0;
int buttonState3 = 0;

void setup() {
  // initialize the LED pin as an output:
  pinMode(ledPin0, OUTPUT);
  pinMode(ledPin1, OUTPUT);
  pinMode(ledPin2, OUTPUT);
  pinMode(ledPin3, OUTPUT);

  // initialize the pushbutton pin as an input:
  pinMode(buttonPin0, INPUT);
}

Done compiling
"C:\Program Files\WindowsApps\ArduinoLLC.ArduinoIDE_1.8.8.0_x86_mdqgnx93n4wtt\hardware\tools\avr
Sketch uses 1168 bytes (3%) of program storage space. Maximum is 32256 bytes.
Global variables use 17 bytes (0%) of dynamic memory, leaving 2031 bytes for local variables. Max
```