A GSM Based Home Security System

A Project submitted in partial fulfillment of the requirements for the Award of Degree of

Bachelor of Science in Electrical and Electronic Engineering

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Dedicated To
Our Parents & Honorable Teacher

Certification

This is to certify that this project entitled "**A GSM Based Home Security System**" is done by the following students under my direct supervision and this work has been carried out by them in the laboratories of the Department of Electrical and Electronic Engineering under the Faculty of Engineering of Daffodil International University in partial fulfillment of the requirements for the degree of Bachelor of Science in Electrical and Electronic Engineering. The presentation of the work was held on September 2018.

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DECLARATION

The project and thesis entitled **“** A GSM Based Home Security System**”** submitted by **Name**: Shipon Saha, ID No: 153-33-3028, Name: Md. Forhad Badsha, ID: 153-33-3028 Session: Fall 2015 has been accepted as satisfactory in partial fulfillment of the requirements for the degree of **Bachelor of Science in Electrical and Electronic Engineering** on November 2018.

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List of Abbreviations

CD	Chromatic Dispersion
EMI	Immune to Electromagnetic Interference
FBG	Fiber Bragg Gratings
FWHM	Full Width at Half Maximum
GVD	Group Velocity Dispersion
LED	Light Emitting Diodes
MD	Material Dispersion
NLSE	Nonlinear Schrödinger Equation
PMD	Polarization Mode Dispersion
PUA	Piecewise Uniform Approach
RMS	Root Mean Square
SSMF	Standard Single Mode Fiber
TFBG	Tilted Fiber Bragg Gratings
UV	Ultraviolet
WD	Wave-guide Dispersion
WDM	Wavelength Division Multiplexed

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ABSTRACT

The purpose of this paper is to focus on a GSM Based Home Security Control System which will be very helpful for our daily life in home, office, industry etc. This system is also very easy to use. We know that now a days automation is playing an important role and this project system will also work automatically. To control this system there is no need any person and this will be less costly. By this GSM Based Home Security Control System we will be able to control light and fan of a room, fire and gas leakage of any house or industry, easily will be able to detect thief. For all these, we have designed A GSM Based Home Security Control System which will be very usable for people. In this project we have used a Nano Arduino. Here we have used a program to run the system. All the sensors have been connected with the Arduino and these will send the information to Arduino. A GSM module is connected with the Arduino. It will also send SMS to the mobile phone. All the systems will work automatically by the sensing devices and the Arduino. The working of the project starts with the sensor which senses the person, gas, temperature, fire and send signal to the microcontroller. By the GSM module, it sends the signal to the owner's mobile phone also. The main objectives of this paper are to control the home security system automatically and send those signals or messages by the GSM system. This system will also send information to the owner of the house/farm/industry/office. Overall this project will play an important role in our daily life.

CHAPTER 1

1.1 Introduction

This is a project of a GSM Based Home Security Control System where an Arduino has been used.. The main aim of the project is to control the home security systems.

The working of the project starts with the sensor which senses the person, gas, temperature, fire and send signal to the microcontroller. By the GSM module, it sends the signal to the owner's mobile phone also.

1.2 History

Home security system has been a feature of science fiction writing for many years, but has become practical since the early20th century following the widespread introduction of electricity into the home, and rapid advancement of information technology. Early remote control devices began to emerge in the late 1800s for example, Nikola Tesla, patented an idea for remote control of vessels and vehicles (Tesla, 1898) in a research work titled "Method for Controlling Mechanisms of Moving Vessels and Vehicles". The emergence of electrical home appliances began between 1915 and 1920. More so, the decline in domestic servants meant for the household needed cheap, mechanical replacement. Domestic electricity supply however was still in its infant stage-meaning this luxury was afforded only by the more affluent households as investigated and published by Harper in2003.

But in this project we have used ten modern technology to control the whole security system of a home . For all these this system is very important.

1.3 Project Objectives

To accomplish a project, the objective of the project must be clear and can be understand to achieve. So, the objectives of this project are:

i. To know about the room temperature.

ii. To detect the thief very easily.

iii. To control the fan, light automatically.

iv. To sense and control the gas leakage very easily.

v. To know about the firing distortion.

vi. To ge the messages of all the circumstances by the GSM system.

1.4 Scope of Project

.

The main purpose of this project is to control the home security system . All the systems are added with the microcontroller. At first the sensor will detect the conditions of all situations and will send signal to the microcontroller. When there will occur any problem, this system will then start automatically and will try to save us immediately. The main scope of this project is that, we may know all information by the GSM system by using a mobile phone.

1.5 Report Outline

Chapter 1 Introduction

Chapter 2 Components of the Project

Chapter 3 Theoretical Model

Chapter 4 Hardware Development

Chapter 5 Results and Discussions

Chapter 6 Conclusions and Recommendations

CHAPTER 2

Components of the Project

2.1 Introduction

To complete this project, many researches and analyze about a GSM Based Home Security Control System had been done. We have used several text books, journals and internet source to complete this project.

2.2 Component List

. 1. Power supply unit

2. Relay

3. Gas Sensor

4. Microcontroller

5. LCD Display

6. GSM Module (SIM800L)

7. Temperature Sensor

8. Fire Sensor

9. Man Detection Sensor

10. LED Light

11. Cooling Fan

12. PIR Module

13. Arduino Control Board

2.2.1 Power Supply Unit (220V)

A power supply unit (or PSU) converts mains AC to low-voltage regulated DC power for the internal components of a computer.

Figure 2.1 Power Supply Unit

2.2.2 Relay

A **relay** is an electrically operated switch. Relays are used where it's necessary to control a circuit by a separate low-power signal. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

Fig 2.2 Relay

2.2.3 Gas Sensor

The gas sensor is very important to detect gas. Here we have used a gas sensor.

Figure: 2.3 Gas Sensor

2.2.4 Microcontroller

A microcontroller is a small computer which consists of a processor core, memory and programmable input or output devices. Now a days microcontroller is used for various purposes. In this project we have used a microcontroller. A program has been set up in this microcontroller.

Figure: 2.4 Microcontroller

2.2.5 LCD Display

Liquid Crystal Display is shortly known as LCD. Now a days LCD Display is very famous for various purposes. In this project we have used a mini LCD display.

Figure: 2.5 LCD Display

2.2.6 GSM Module (SIM800L)

A GSM Module is an electronic device which is used to communicate between mobile or other device.

Figure: 2.6 GSM Module

2.2.7 Temperature Sensor

A temperature sensor plays an important role in many situations. By this sensor temperature of the room can be detected very easily.

Figure: 2.7 Temperature Sensor

2.2.8 Fire Sensor

A fire sensor is one kind of sensing device which can detect fire very easily. In this project we have used a fire sensor.

Figure: 2.8 Fire Sensor

2.2.9 Man Detection Sensor

A man detection sensor is a sensor which can detect any person very easily. Here we have used a man detection sensor.

Figure: 2.9 Man Detection Sensor

2.2.10 LED Light

Light Emitting Diode is shortly known as LED. In this project we have used some LED Light.

Figure: 2.10 LED Light

2.2.11 Cooling Fan

Cooling fan has been used to pass away the gas from room. Here we have used a cooling fan**.**

Figure 2.11 Cooling Fan

2.2.12 PIR Module

PIR Module is a sensor which can measure infrared light radiating from objects in its field of view. In this project we have used a PIR Module.

Figure 2.12: PIR Module

2.3 Summary

The chapter describes about some important equipment that related to the project. Describes of all equipment like Power Supply Unit, Relay, Gas Sensor, Microcontroller, LCD Display, GSM Module, Temperature Sensor, Fire Sensor, Man Detection sensor, LED Light, Cooling Fan, PIR Module etc. that work properly to complete the project.

CHAPTER 3

THEORETICAL MODEL

3.1 Basic Block Diagram

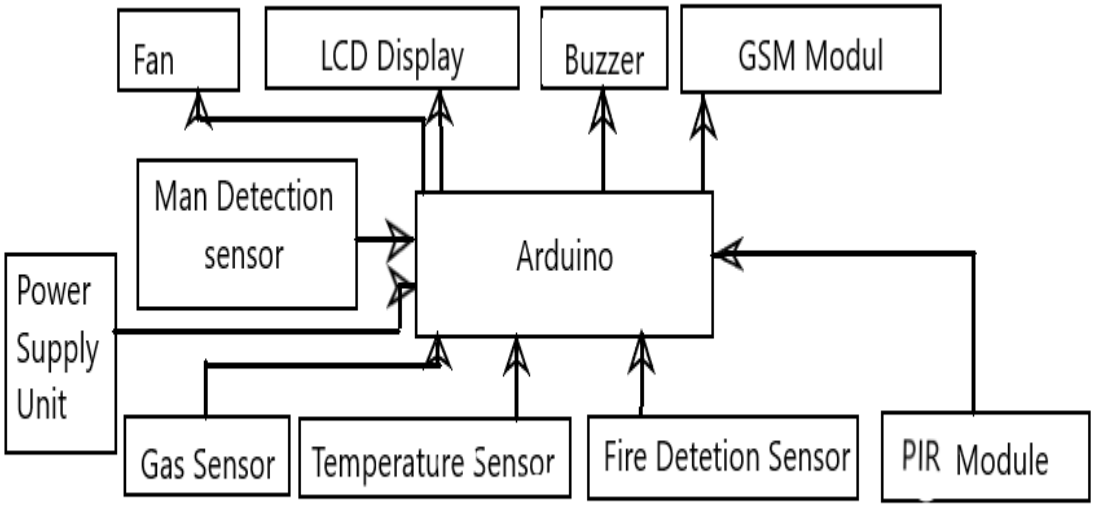


Figure: 3.1 Basic Block Diagram

A power supply unit has been added with the Arduino. A man detection sensor, a gas sensor, a temperature sensor, a fire detection sensor and a PIR module have been connected with the Arduino. A fan, an LCD display, a buzzer and a GSM module have also been connected with the Arduino. The man detection sensor will detect person and send signal to the Arduino. Then the buzzer will be run by the Arduino command. The GSM module will send an SMS about that to the mobile phone. The gas sensor will also detect gas of the room and send signal to the Arduino and the Arduino will send a signal to the buzzer. An SMS will also be sent by the GSM module to the mobile phone. The temperature sensor will sense the

temperature of the room and will be displayed on the LCD display. The fire detection sensor will sense the fire of the room and send signal to the Arduino and it will send signal to the buzzer and an SMS will be sent by the GSM module to the phone. The PIR module will automatically start the light, fan when a person will enter into the room. All the system will be run by a program.

3.2 Circuit Diagram

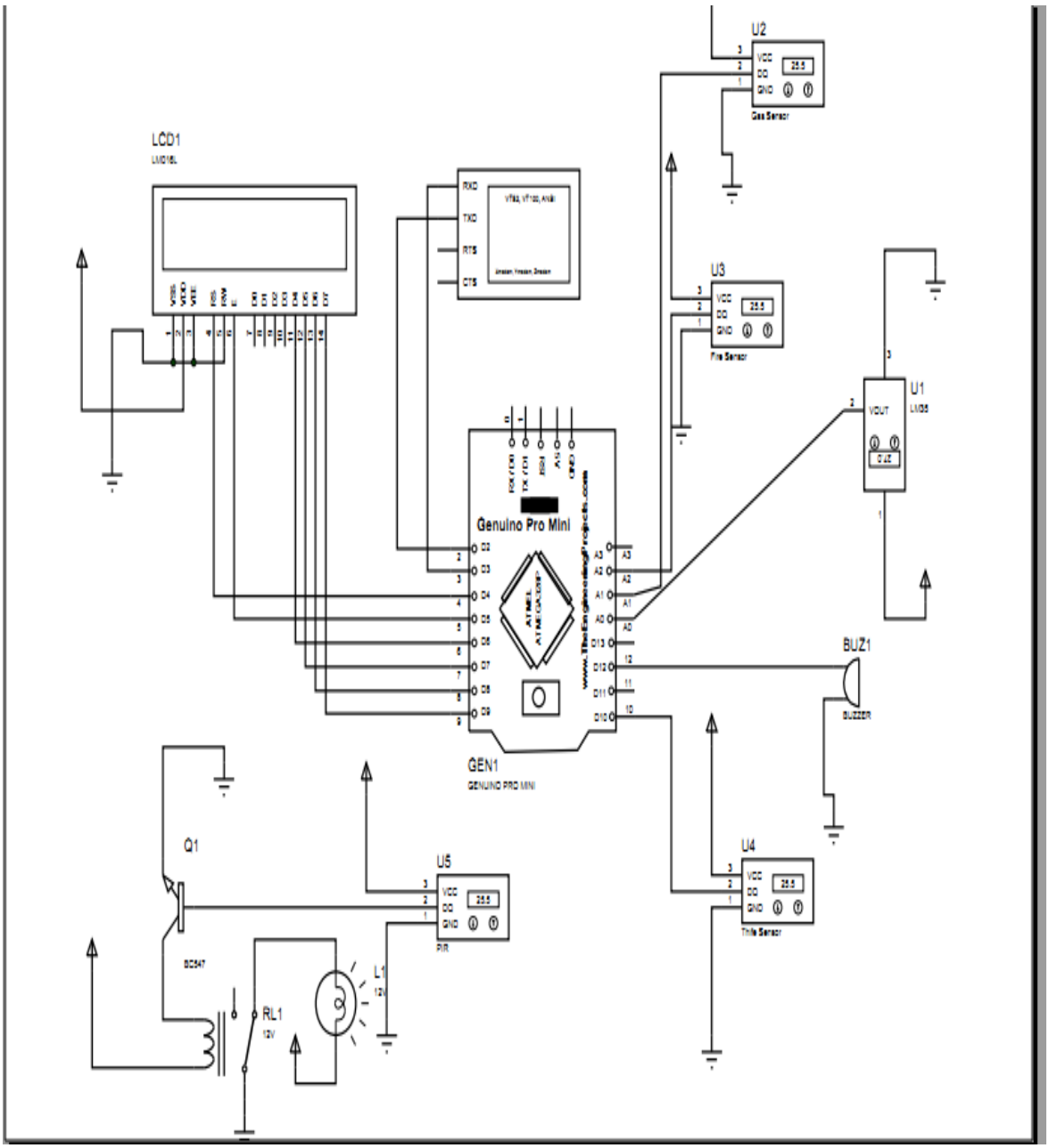


Figure: 3.2 Circuit Diagram

On the above figure we can see the circuit diagram. Five types of sensors with 1 K-OHM have been added with the Nano Arduino. A LCD display and a buzzer have been connected with the pins of the Arduino. The GSM module has been connected with transmitter and receiver part with the Arduino

3.3 Arduino Circuit

Arduino Pro Mini circuit was build and the main components for the main circuit for this Arduino are required in order to operate the Arduino Pro mini.

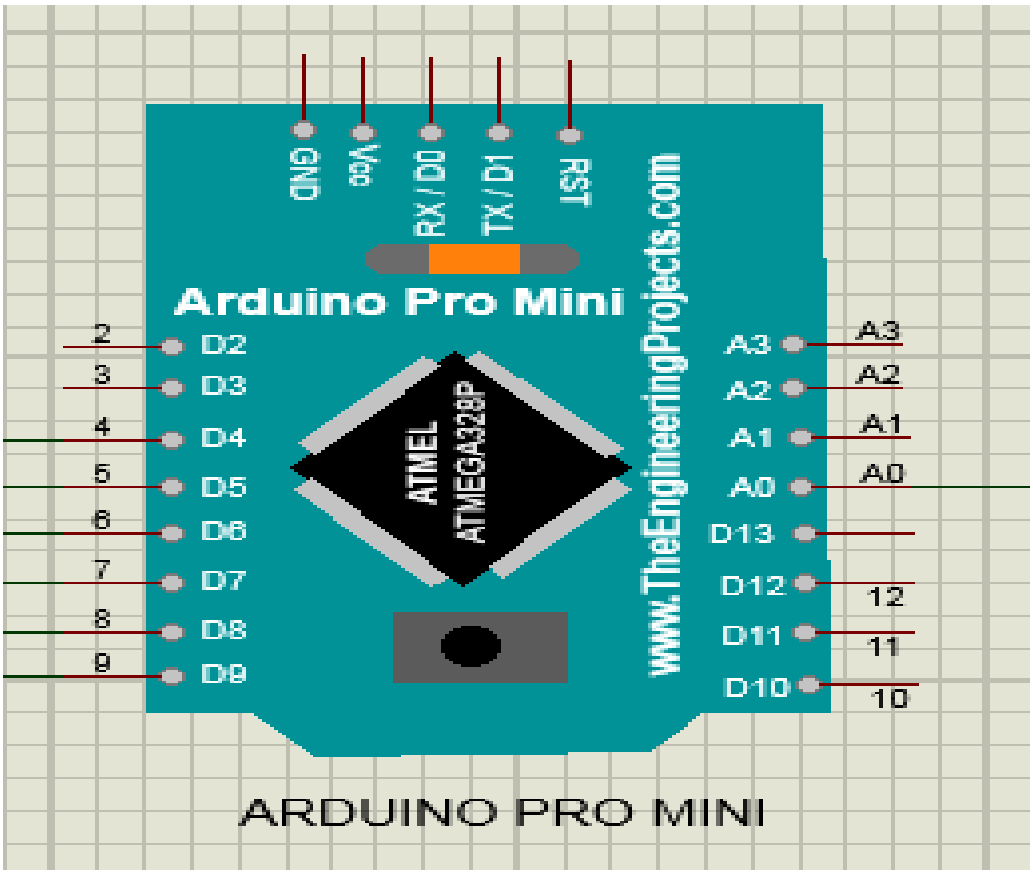


Figure 3.3 Arduino pro mini

3.4 Summary

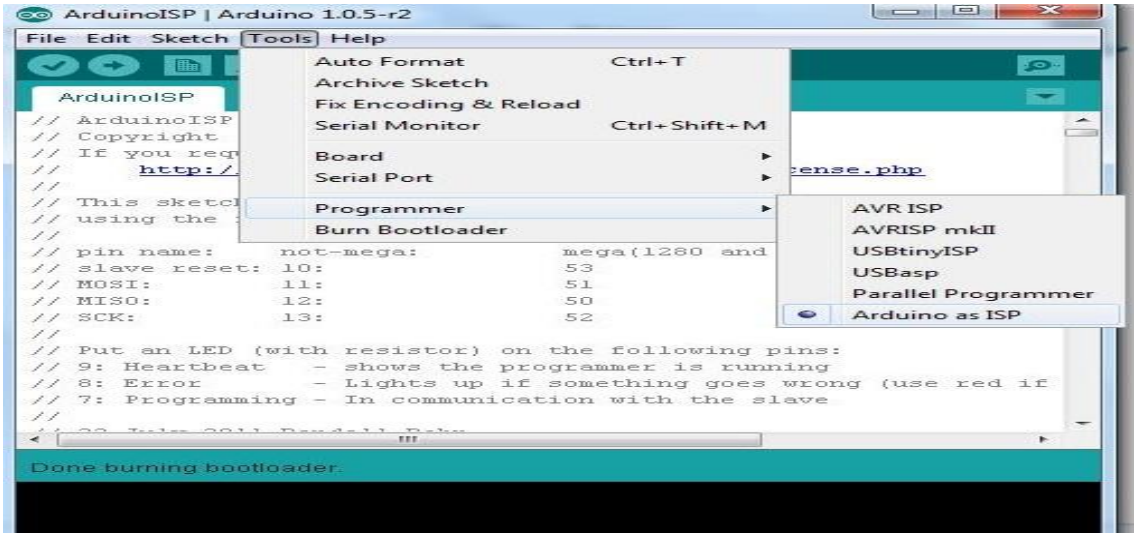
In this chapter has discussed about block diagram, circuit diagram, Advantage and Disadvantage of this project. It has also explained operating system of the project.

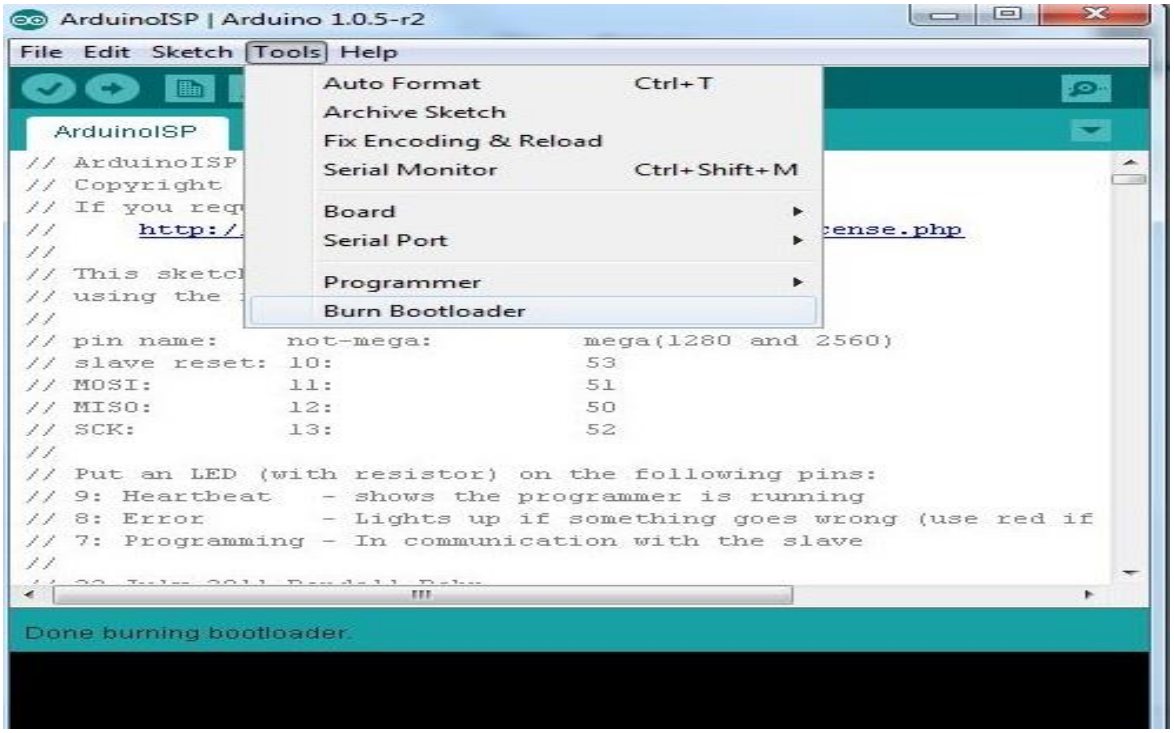
CHAPTER 4

HARDWARE DEVELOPMENT

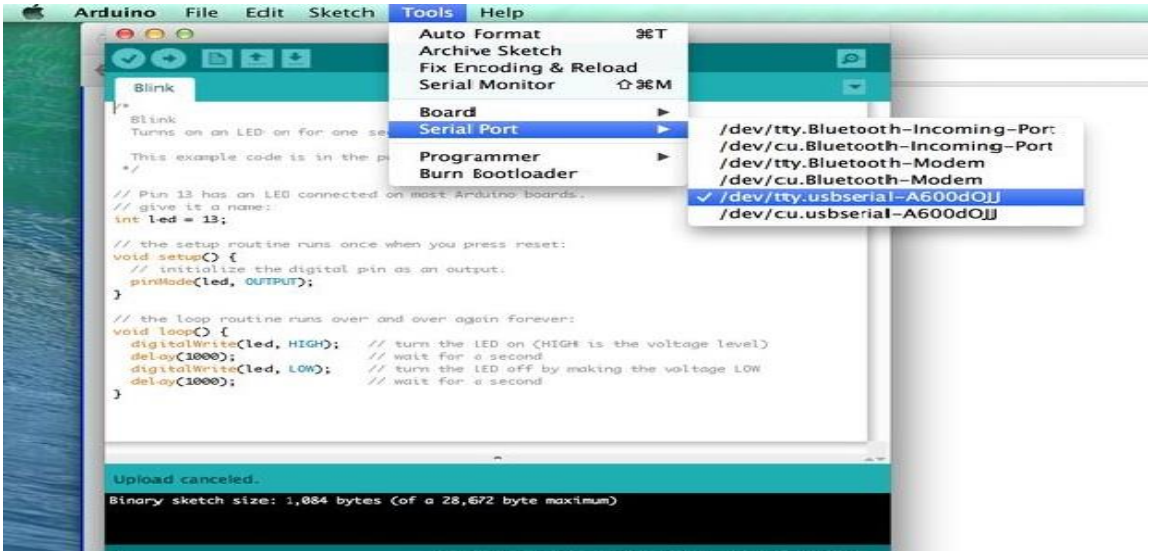
In this chapter we shall discuss about the hardware development.

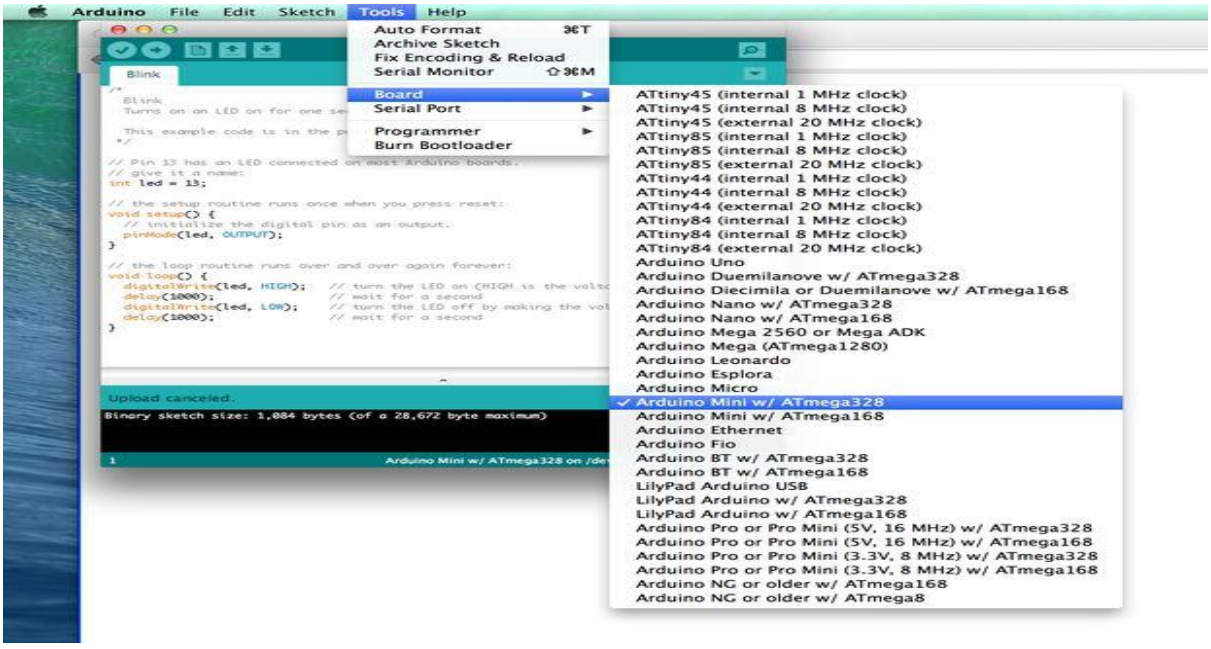
4.1 Burning the Program





4.2 Burning Boot Loader Process





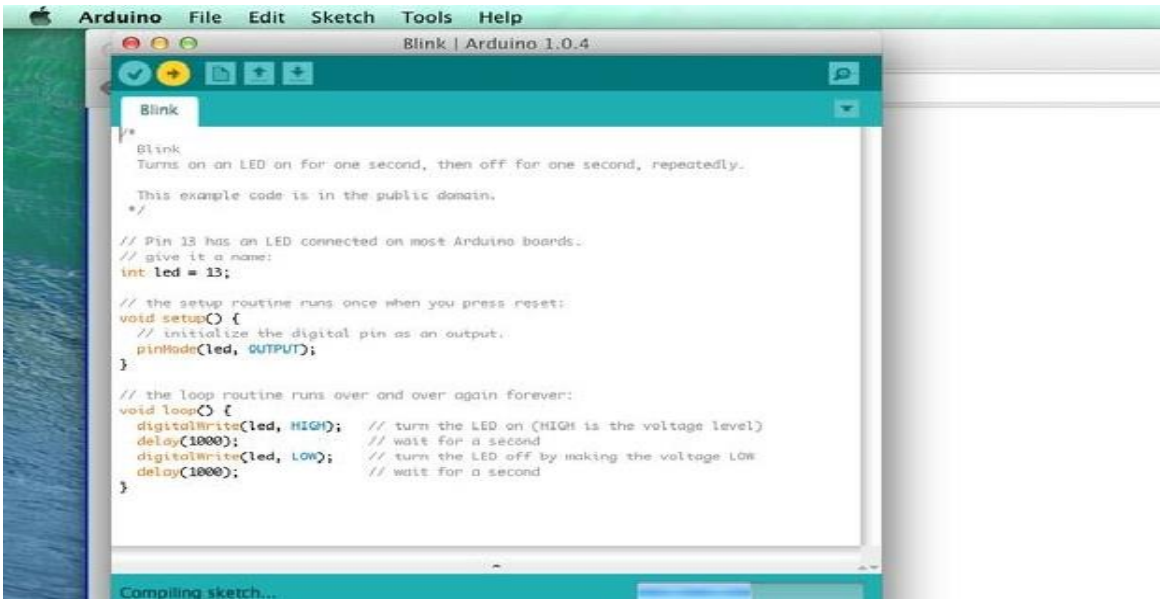


Figure 4.1: Burning Boot Loader Process

Connect the all circuit connection now open the Arduino software and select tools->Board ->Arduino Pro or Pro Mini (5V, 16MHZ) vv/ ATmega328. If we select the Arduino pro we can see the selected board in the bottom of the software as shown in above image.

And open the coding we want to program and click the upload button. Now we can see that program uploading into pro mini. We can see the Tx and Rx Led in Arduino board blinking while program uploading. After uploading of the code. Now remove the all connection and give power supply to the pro mini. Our code works perfectly on Arduino mini.

4.3 System of the Flow chart

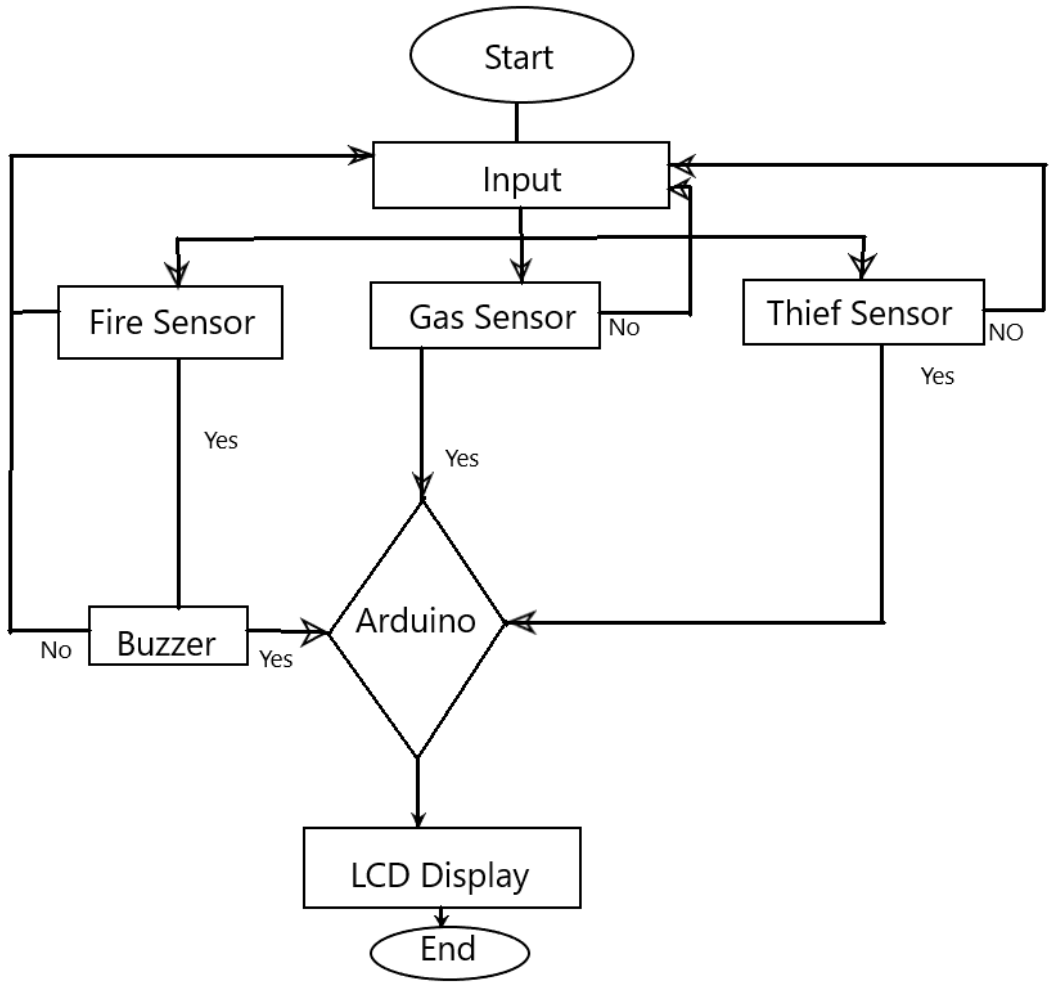


Figure: 4.2 System of the Flow chart

On the above picture we can see a flow chart of our project. The fire sensor will detect the fire. If yes then the buzzer will ring a sound and if no then the system will again return to input. For the gas sensor it will work same as the fire sensor by sensing the

gas. Thief sensor will also detect man or thief and will send signal to the arduino and the arduino will send the command to the buzzer to ring. All the systems will be shown in the display.

4.4 Summary

In this chapter we have discussed about writing and burning the program and also have discussed about the flow chart.

Chapter 5

RESULTS AND DISCUSSIONS

5.1 Introduction

In this chapter we shall discuss about the result and discussion. I think this project will be very helpful for the people of our country. There is also so much scope to develop this system.

5.2 Our Project

After connecting with all equipment of our project ,the system will start properly. We have used a program to run the system. Our project picture is given below:

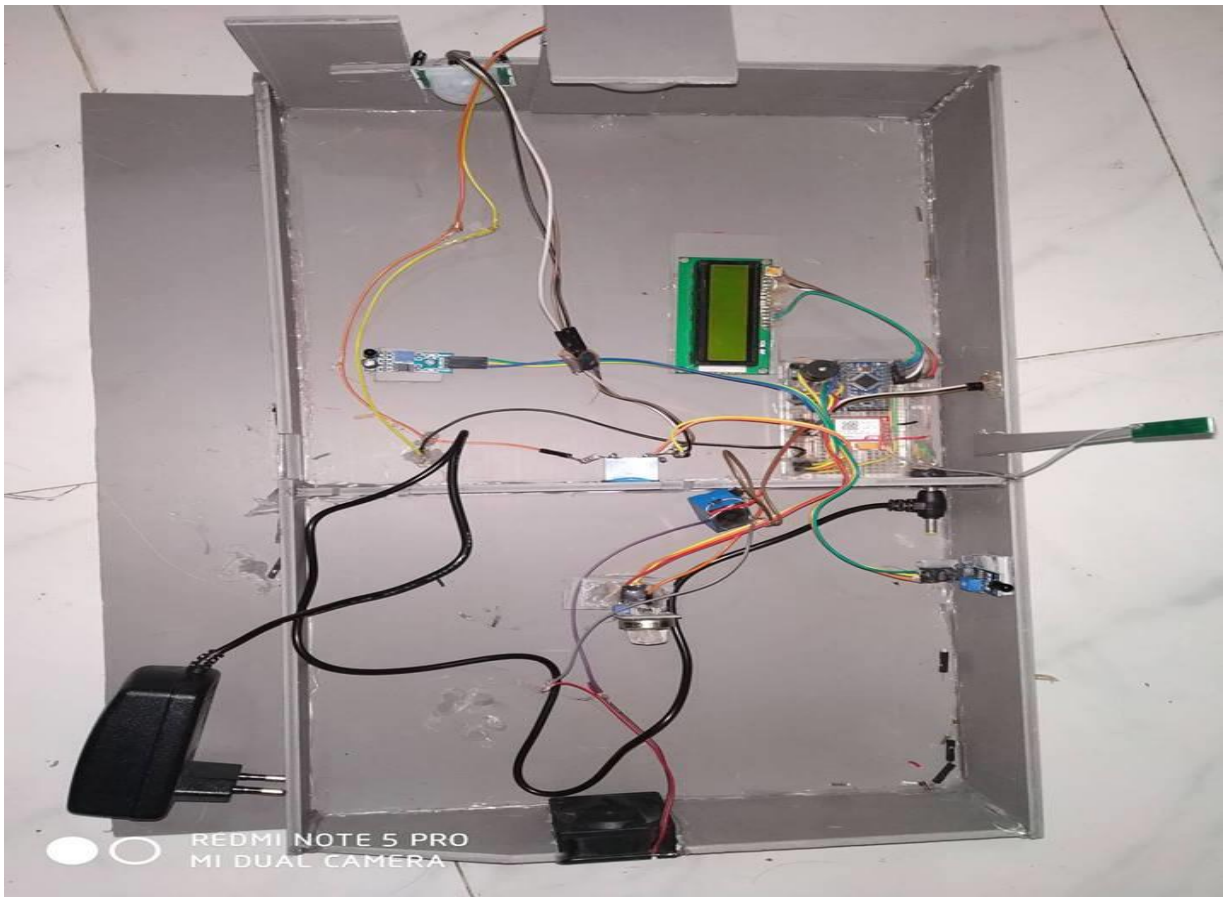


Fig. 5.1 Our Project Picture

5.3 Result

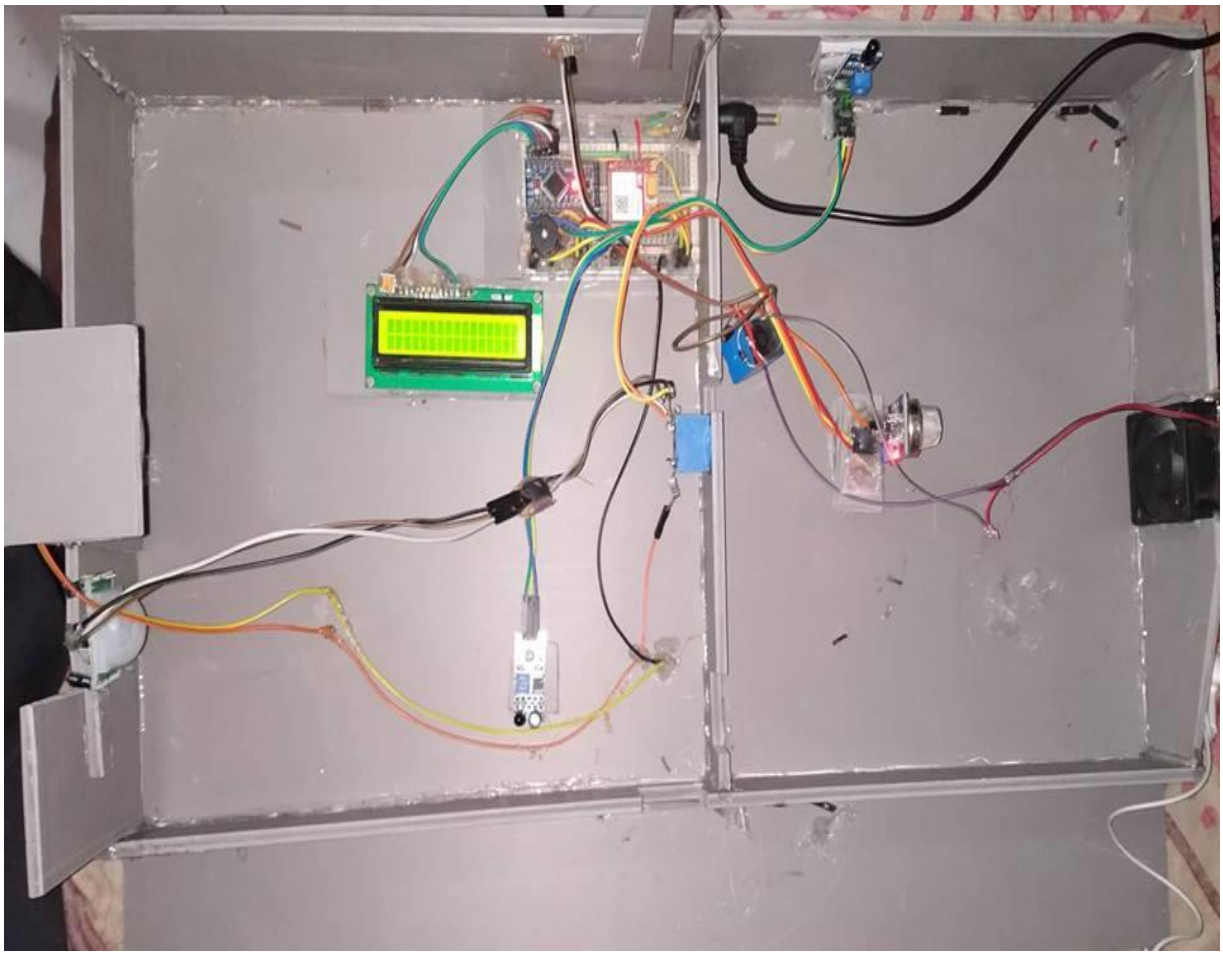


Figure 5.2 Output Picture

On the above picture we can see the output result of our project. All the systems of the project are working very nicely. It is very easy to control the system.

5.4 System Cost

Serial	Components	Price in (BDT)
01	Arduino Nano	450
02	LCD Display	160
03	Capacitors	30
04	Some Resistors	20
05	Diode	10
06	GSM Module	850
07	Connector	20
08	Adaptor	130
09	Some Wires	30
10	Sample PCB	800
11	Model Bord, Structure And ETC	1000
12	Cooling Fan	80
13	Man Detection Sensor	450
14	Relay	100
15	Fire Detection Sensor	350
16	Temperature Detection Sensor	250
17	PIR Module	600
18	LED Light	60
19	Gas Sensor	450
Total Cost		**5840 TK. BDT**

Table 5.1: Cost Analysis

5.5 Discussion

The project has been tested and it has worked properly. I think the people of our country can easily use this technology. This system will be low cost for the people.

5.6 Advantage and Disadvantage

Advantage:

1. It can detect any person very easily.
2. It can detect the room temperature very easily.
3. Room light and fan will start automatically.
4. It can detect the gas leakage very easily.
5. It will be able to detect fire and will start fire alarm.
6. It will also send SMS to the mobile phone.

Disadvantage:

. 1. The software code is programmed. So sometimes it will be difficult to solve the software problem

5.7 Summary

In this chapter has discussed about result and discussion. With our project we became successful to demonstrate with regarding the objectives of the project. At last completing this chapter the project is ready to use.

CHAPTER 6

CONCLUSIONS

6.1 Conclusion

In this project we have tried to do special for the people. This is a modern project and this will be so much cost efficient for all kind of people. In this project we have used a Nano Arduino. Here we have used a program to run the system. All the sensors have been connected with the Arduino and these will send the information to Arduino. A GSM module is connected with the Arduino. It will also send SMS to the mobile phone. All the systems will work automatically by the sensing devices and the Arduino. I think it is a standard model to control the home security system.

6.2 Limitations of the Work

Mention few limitations or challenges faced in my work. In this project, we have faced few problems as like as.

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Appendix

The code that we have used:

```
#include <LiquidCrystal.h>
LiquidCrystal lcd(4, 5, 6, 7, 8, 9);
int buzzer=12;
#define sensor A0
int gasPin =A1;
int firePin = A2;
int pirPin = 10;
int sensor_value;
float temperatura;
String data;
byte degree[8] =
            {
              0b00011,
              0b00011,
              0b00000,
              0b00000,
              0b00000,
              0b00000,
              0b00000,
              0b00000
            };

void setup()
{
  Serial.begin(9600);
  lcd.begin(16,2);
  lcd.createChar(1, degree);
  lcd.setCursor(0,0);
  lcd.print(" GSM Based Home    ");
  lcd.setCursor(0,1);
```

```
 lcd.print(" Security System   ");
 delay(4000);
 lcd.clear();
 lcd.print("   Daffodil IU  ");
 delay(4000);
 lcd.clear();
 pinMode(buzzer,OUTPUT);
 pinMode (gasPin,INPUT);
 pinMode (firePin,INPUT);
 pinMode (pirPin,INPUT);
  mySerial.begin(9600);
 mySerial.println("\r");
 delay(1000);
 mySerial.println("AT+CMGF=1\r");
delay(1000);
}

void loop()
{
 if (mySerial.available())
   {
    temperatura = (5.0 * analogRead(A0) * 100.0) / 1024;
    int tempC1 = temperatura;
    int tempC2 = (temperatura - tempC1) * 100;
    char msg[24];
    sprintf(msg, "%i.%i", tempC1,tempC2);
 if(temperatura>45)
    {
     data+="Tempareture Higher Alrat...";
     data+="Current Room Temperature: ";
     data+=(msg);
     mySerial.println("AT+CMGS=\"+8801850182807\"\r");
     delay(1000);
     mySerial.println(data);
```

```
    delay(1000);
    mySerial.println((char)26);
    data="";
   }
  sensor_value = digitalRead (gasPin);
  if (sensor_value == LOW)
  {
   data+="Gas Leakage Alart...";
   data+="Current Temperature: ";
   data+=(msg);
  mySerial.println("AT+CMGS=\"+8801850182807\"\r");
   delay(1000);
   mySerial.println(data);
   delay(1000);
   mySerial.println((char)26);
   data="";
  }

  sensor_value = digitalRead (gasPin);
  if (sensor_value == LOW)
  {
   digitalWrite(buzzer,HIGH);
   }

  sensor_value  = digitalRead (firePin);
  if (sensor_value  == LOW)
  {
   data+="Fire Alart...";
   data+="Current Temperature: ";
   data+=(msg);
   mySerial.println("AT+CMGS=\"+8801850182807\"\r");
   delay(1000);
   mySerial.println(data);
   delay(1000);
```

```
    mySerial.println((char)26);
    data="";
   }
      sensor_value = digitalRead (firePin);
   if (sensor_value == LOW)
   {
    digitalWrite(buzzer,HIGH);
   sensor_value = digitalRead (pirPin);
   if (sensor_value  == LOW)
   {
    data+="Thief Alart...";
    data+="Current Temperature: ";
    data+=(msg);
    mySerial.println("AT+CMGS=\"+8801850182807\"\r");
    delay(1000);
    mySerial.println(data);
    delay(1000);
    mySerial.println((char)26);
    data="";
   }

   sensor_value = digitalRead (pirPin);
   if (sensor_value == LOW)
   {
    digitalWrite(buzzer,HIGH);
     }

//      *---------Temperature-------*/
     float reading=analogRead(sensor);
     float temperature=reading*(5.0/1023.0)*100;
   delay(10);

  /*------Display Result------*/
    lcd.clear();
```

```
    lcd.setCursor(0,0);
   lcd.print("Room Temperature");
    lcd.setCursor(4,1);
    lcd.print(temperature);
    lcd.write(1);
    lcd.print("C");
    delay(100);
    }
    delay(100);
}
```