"Home and Agriculture Automation via Bluetooth Technology"

A PROJECT

Submitted in partial fulfilment of the requirements for the award of the degree of

BACHEOR OF TECHNOLOGY

IN

ELECTRONICS AND COMMUNICATION

Under the supervision of

Dr. Rajiv Kumar

(Associate Professor)

By

Nikhil Aggarwal (141034)

Rajat verma (141035)

Shikher Gupta (141044)

to

Jaypee University of Information Technology

Waknaghat , Solan -173234

Himachal Pradesh, INDIA

CERTIFICATE

This is to certify that the work which is being presented in the project report titled **"HOME and AGRICULTURE AUTOMATION VIA BLUETOON TECHNOLOGY"** in partial fulfilment of the requirements for the award of the degree of B.Tech in Electronics and Communication Engineering and submitted to the Department of Electronics and Communication Engineering, Jaypee University of Information Technology, Waknaghat is an authentic record of work carried out by "**Nikhil Aggarwal(141034), Rajat Verma(141035) and Shikher Gupta(141044)"** during the period from August 2017 to May 2018 under the supervision of **Dr. Rajiv Kumar**, Department of Electronics and Communication Engineering, Jaypee University of Information Technology, Waknaghat.

Nikhil Aggarwal   Rajat Verma   Shikher Gupta

(141034)   (141035)   (141044)

The above statement made is correct to the best of our knowledge.

Dr. Rajiv Kumar

Associate Professor

Electronics and Communication Engineering

Jaypee University of Information Technology, Waknaghat, India

Dated:

AKCNOWLEDGEMENT

Nikhil Aggarwal   Rajat Verma   Shikher Gupta

(141034)   (141035)   (141044)

CONTENTS

List of Figures

List of Tables

CHAPTER 1

INTRODUCTION

1.1 History

It may seem that the idea of home automation, and wireless automation, are a few things that has only come put in the past few years. While this is often not precisely inaccurate, as automation has only reached a high level of pertinence and business success recently. The history of home automation stretches back much further than many folks may think. The primary smart homes was not a structure. For several years, sci-fi has explored the thought of home automation. According to Bradbury, "Automated home is the home which work forever even after death of humans".

- **Early 1900- Research of new devices** – home devices wern't whatawe'd contemplate "smart," they become out of this world achievement within the early 1900s. These attainments started with primary the invention in early nineteen century. Real-world electricity-powered vacuum was designed in 1907. The course of 20 years fridges, garments dryers, laundry machines, and many more were invented.

- **Mid-20th century invention of ECHO IV and the Kitchen Computer** – Tho' it had been ne'er marketable sell-out, this was the very primary serviceable thing. This device might calculate searching things, control the home's temp and, switch devices on/off. The KitchenComputer which was invented in the following year, might stock recipes, however had the ill-starred tagline, and as a result sold no models.

- **End-20th century Gerontechnologya**– Gerontechnologyacombined medicine and technologya and made the livesaofasenior voters easier. Within the Nineties, there was a vast invention and large analysis of technology.

- **Early 21ˢᵗ century construction of Automated Homes** – Smartahomesabeganato extend and became popular in early 20st century. Asasuch, sundry technology started increase. Automated homes abruptly becameaaamoreareasonable possibility, and so a viable technology for customers. New technology developed started to appear on shops for people.

- **Current Automated Homes** – Current automated homes are aboutasafety and living greener. Our smartahomesaareasustainable, andatheyaassist to ensure that our homes are not consuming unnecessary energy. They also help alert us regarding intruders. Present trends in home automation include remote mobile control, automated illuminations, machine-controlled thermostat adjustment, scheduling appliances, mobile notifications, and remote video surveillance.

Home automation process started with labour saving machines. Autonomous electrical or gas powered appliances started to come in the decennium with the invention of electricity and led to the primer of laundry machines, water boiler, fridges, and stitching machines, and garments dryers.

In end 20ᵗʰ century, the primal automation network technology, was developed. It's a communication based tech. which mainly uses power transmission wiring for signalling and controlling, wherever the signalsinvolve transient freq burst of info.

1.2 BENEFITS

1.2.1 Security through Devices

One of the most important is protection for our friends and family. We have the capability to control the electrical or electronic devices with just a slight tap by you on high-tech smart phone. Home and family conjointly relish additional degreeof safety through your ability to regulate the lights in the premises of house. Not solely will this permit you to make sure lights are off when you are absent from home to save electric power, it allows you to turn on the appliance form your smart device. This conjointly surge theprotection of house.

1.2.2 Saves Time

Because of the hi-tech nature of home automation system, now in the present world of hurry and having no time one can save his/her time. You can easily operate devices within no time from anywhere. This saves a lot of time and energy, which you can utilise more efficiently anywhere else and hence, this is very helpful in the present era of hurry.

1.2.3 Saves Money and Increases Convenience

The most favourable impact of the system that can have is on per month household bill. Not Much longer time you have to spend your hard-earned money for the devices which are left ON by the family members and friends. User will have full control on the device in hand while moving anywhere and can reduce the bill cost of their homes without doing much efforts.

1.3 TECHNOLOGIES

1.3.1 WI-FI

Undoubtedly, Wi-Fi is there in each home, thus it goes without saying that a good variety of machine-controlled devices are already suited with this standard and therefore its advantages are various. Nearly everybody has access to Wi-Fi and lots of customers are considering that home automation systems have it placed. It was invented to control huge amount of traffic, and control bandwidth to control our home devices. From a security view, Wi-Fi Protected Access encoding provide full security to the user and security to their home devices when executed

Wi-Fi has limited B.W. which is a matter of concern. Its connection speed may be belittled or perhaps changed by having different appliances within range. Thus, there is moderate response time. The best information is that almost all HA finish points aren't bandwidth hogs, thus reaction time might not matter. Consumption of battery is also a problem, as wi-fi consume large amount of power as compared to other technology as Wi-Fi consumes more power than other technologies.

1.3.2 BLUETOOTH SMART

Bluetooth Smart, is a form of energy coherent Bluetooth wireless technology typically present in smart phone devices, and excellent to be used with the headphones and headset. Although the range of Bluetooth is finite, the energy consumption of Bluetooth is low. Its order of energy when combined with smart phone devices make it straightforward for developers and employees to develop new solution which may instantly be attached to prevailing systems. Bluetooth lie in the free range of frequency range around two point four to two point four eight five giga hertz.

1.3.3 ZIGBEE

It is a low cost device having low power and it is a type of wireless mesh network having "IEEE number as 802.15.4". ZigBee has maximum attention as upcoming Technology. ZigBee Uses low power such as low price ZigBee radios. The concept of ZigBee is based on sending and receiving of internet protocol 6 packets to user and send back the information to the user. This lead to wide range of ranging for home automation.

1.4 ADVANTAGES

1.4.1 Controlling all home appliances from one place

All the devices in home are connected to the single interface which is the great achievement of technology and house management. All the devices are connected with a single app and you only have to learn the way how to control the devices through mobile application.

1.4.2 Easy to use new Technology and Devices

We can easily connect the new technology and devices with the one which are already installed in the house. You will not need to stick with the old technology and can easily switch to new technology having the ability to assimilate new devices will make your work easier.

1.4.3 Helpful for Physically Handicapped

Physically handicapped people can easily control home appliance by sitting or while resting Without any discomfort

1.4.4 Remote control of devices

The ability of having the control over home appliances form remote area or from anywhere You can control the temperature of your home from your office and your working area without physically present in the home. You'll be able to can examine to check if you have left the lights on, who is there in front of your house while you are away.

1.4.5 Energy efficient and Power saving

You can make your home more energy efficient through smart home technology. We can easily control home appliances such as Air Conditioner, heater and many more devices and can save a lot of energy. Easily switching OFF devices which are unnecessarily working or not in use by the family members.

1.5 SYSTEM LAYOUT

The HAS consists of the arduino board which is connected to the Bluetooth module, and relay module. The system is based on serial data transmission using the android smartphone. A command from individual modules is sent to the arduino Uno i.e. stream of character for the Bluetooth module and the corresponding pin is made HIGH which switches ON the relay corresponding to the appliance and the appliance is turned ON. A user interface on the android enabled android phone offer system connection and control utilities. Our Water Pump is connected with fourth terminal of relay which is operated on the state of Soil and Moisture Sensor. A temperature and humidity Sensor is connected with the arduino board to display Temperature and humidity present in the environment.
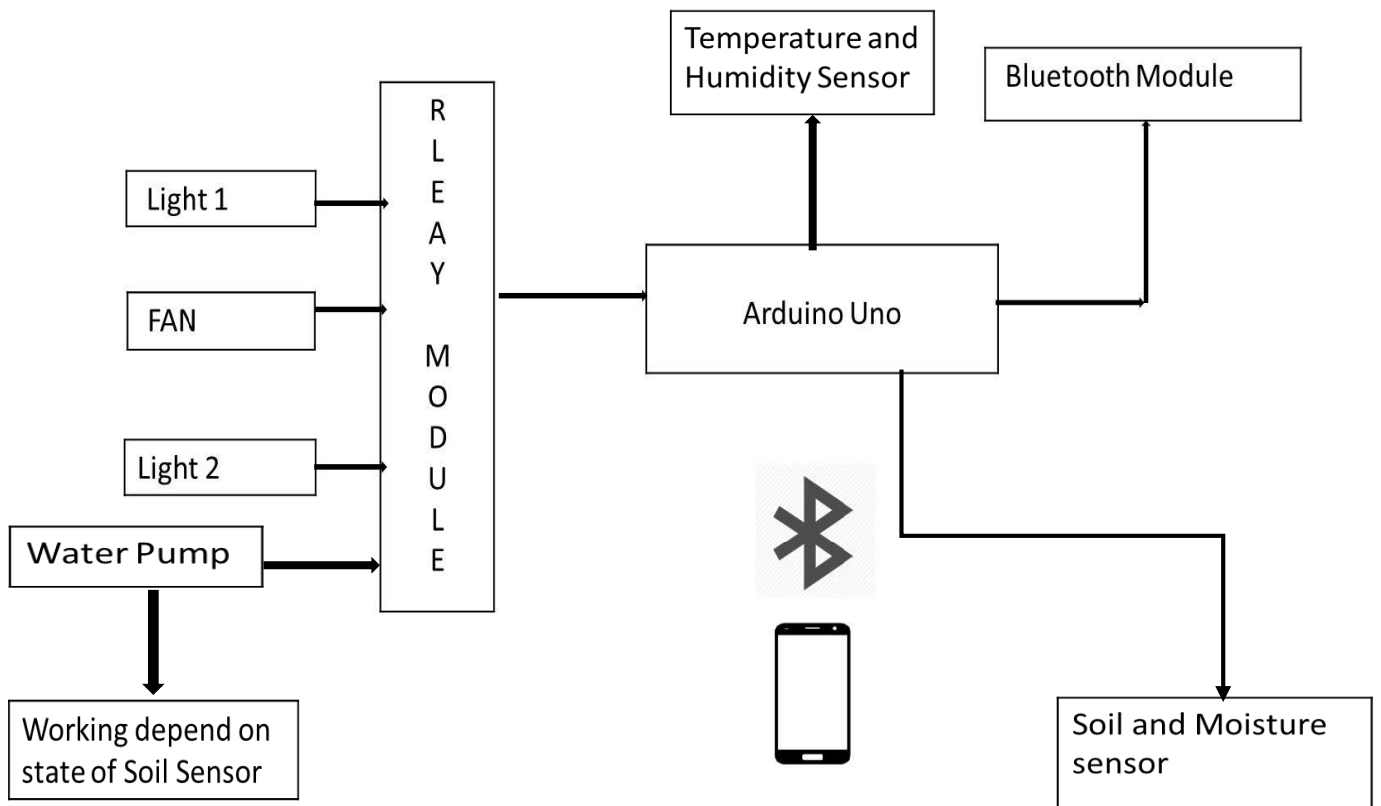

Figure 1: System Layout of HAAS

CHAPTER 2: THE ARDUINO UNO

INTRODUCTION

The HOME AUTOMATION system is build using various components available and most important of these components is the Arduino Uno board. Which is a microcontroller board mainly based on

ATmega328P. "Uno" meaning in Italian is one and was chosen to mark the release of

Arduino software (IDE) 1:0. The code for this project is developed using the Arduino IDE in embedded C language. This board is the brain of the system as it is able to make decisions based on the values received by various other components of the system which are used to make the system.

2.1 HARDWARE

Arduino is a microcontroller board which can be used for various automation applications to provide hi-tech solutions for the various problems.it is easily supported by maximum of the microcontrollers and it can also work or support different languages like c, cpp etc. the arduino uno board which we are using is ATmega328P. It has different analog and digital pins which are mentioned in the below table.

Table 1: Arduino Parameter   [10]

Microcontroller Used	ATmega328
Operating Voltage of Arduino	5 Volts
I/p Voltage	7-12 Volts
Digital I/O pins	14
Digital Pulse Width Modulation Pins	6
Analog I/P pins	6
Direct Current per I/p pins	20 mille Amps
Flash Memory	32 Kilo Byte
Clock Speed	16 Mega Hertz

2.2 PIN DIAGRAM
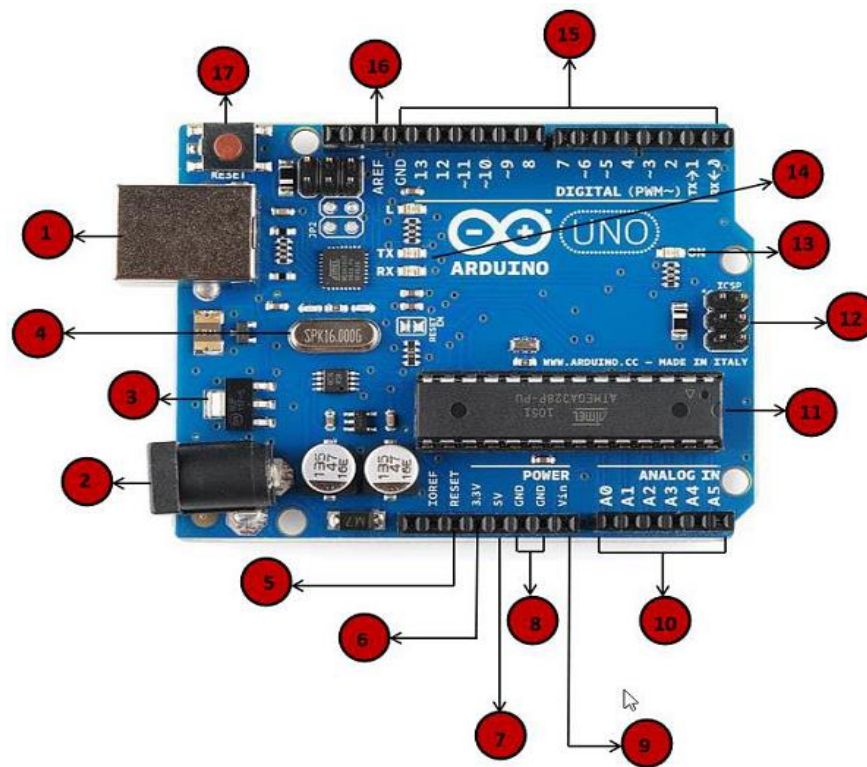
[10]

Figure 3: Arduino Pin description

1. "Power USB".

"Aurdino board is highly powered by the usb cable from our laptop. All we have to try is to connect the USB cable to the USB affiliation".

2. "Power (barrel jack)".

Arduino board are oftenly "highly powered directly through the AC mains power supply directed by connecting it to the power barrel jack".

3. "The voltage regulator".

The main function of the power transformer is "to regulate the voltage supply which is given to the arduino UNO board and stabilizing the DC volt" "utilized by its processors and its alternative parts."

4. "Crystal oscillator".

The "crystal oscillator helps the arduino board to handle the time related problems". Its solution is given by quartz oscillator. The sixteen is written on the high of arduino UNO.000H9H. "This tells North American nation that the frequency is 16,000,000 HZ or sixteen Mega Hertz".

5. "Arduino reset".

We can reset our aurdino board i.e. "start our program from start .we will reset the UNO board in 2 way in which". First by exploitation of push button on the aurdino board.

6. "Analog pins".

The "arduino UNO board has five analog input pins A0 through A5". These pins will scan the signals from "AN analog device just like the gas device or humidness device and convert it into digital price that may be scanned by the silicon chip".

7. "Main microcontroller".

Each Arduino board has its own microcontroller. You'll "will be able to assume it because the brain of your board .Most of the ICs onathe board are slightly too totally different from

each other". You need to recognize which "IC is there in the board which you will need before loading up a program from the ARDUINO IDE". For a lot of details concerning the IC construction and functions, you'll be able to confer with the information sheet.

8. "Icsp pin"

Mostly, "ICSP is associate degree AVR", "a small programming header for the arduino consisting of MOSI, MISO, SCK, RESET, VCC, and GND". "It's typically mentioned as associate degree SPI that may well be thought-about as associate degree "expansion" of the output". Actually, "you are slaving the output device to the master of the SPI bus".

9. "Power led indicator"

This diode activates once you plug your Arduino into an influence supply to indicating that your board is obtaining power properly. If this light-weight does not activate, then there's one thing wrong within the hardware association.

10. "TX and RX Led"

On your board you will notice two "labels TX and RX" they seen in two places on the Arduino UNO board. "1st at the digital pins zero and one, to point the pins accountable for serial communication". "Second, the Transmit and Receive junction rectifier". The transmit junction rectifier flashes with completely different speed whereas causing the serial knowledge.

11. "Digital I/O"

The arduino Uno board has fourteen digital Input- Output pins of 6 give pulse width modulation output. These pins will be organized to figure as input digital pins to browse digital values 0 and 1 or as digital output pins to drive completely different modules like LEDs , relays etc.

12. "AREF".

"AREF stands for Analog Reference". It is typically wont to set associate in nursing external reference "voltages between zero and five volts because of higher limit for analog input pins".

2.2 ARDUINO SOFTWARE (IDE)

The Arduino project facilitates the Arduino unmatched development environment known as Integrated Development Environment which is a cross-platform suit in the Java which is a programming language. Arduino project derives from the IDE for the Processing of language in the system. Board has a code editor which is used to perform various functions like clipping of text, search for the text.

Ardunio works on many languages espesccially on java , c ,cpp having its own syntex and simentic. In "Home and Agriculture" project C language has been used to control different appliances using bluetooth module and board.

- **setup():** This function once runs at the start of the program to begin settings.
- **loop():** This function is executed repeatedly until the board is powered off or is reset.

After completing and linking with the GNU which is a tool chain, also included with the IDE distribution. The Arduino IDE enrol the program avr-dude which can change the executable code into text file which is in hexadecimal encoding so we can upload it into the arduino board into the Arduino board by a loader program in the board's firmware.

The Arduino software is easy to use software for first timers, yet it is payable for advanced users. It can runs on Mac, Windows or even on Linux.

CHAPTER 3: BLUETOOTH

INTRODUCTION

In our HAS project we have employed the HC05 Bluetooth module to interface with the smartphone. As the Bluetooth module accepts a character from the smartphone, it sends a message to the Arduino uno to make the pin corresponding to the device HIGH.

3.1 THE BLUETOOTH TECHNOLOGY

Bluetooth is a technology which does not include wires for exch. info. Over nearby area from movable and non- movable electronic devices. This technology uses short-wavelength ultra-high frequency radio waves in the industrial scientific medical band from 2.4-2.485 giga hertz.

Bluetooth works on packet protocol. It has one master to give order to different slaves in a specific piconet. Packet exch. is defined by the master and not by the slaves. The timepiece pulses at an approximate rate of 312.5 micr sec. Even slots are trans. And the slots which are not even are rec. Length of packets can be one, three or five slots long.

3.2 THE BLUETOOTH MODULE HC-05

HC-05 module which works on SPP protocol which stands for Serial Port Protocol which is designed for transmission using a technique without the use of wires.

3.2.1 The HC-05 pin out

Hc-05 modulator contains six pins which are mentioned in below table-

Table 2: HC-05 Pin Configuration   [8]

KEY	"When Power is applied LED blinks slowly As KEY become HIGH".
VCC	+5 Voltage
GND	Arduino connected to ground
TXD	"Transmitting of data which is serial in its natural form"
RXD	"Receiving of data which is only serial in its natural form"
STATE	"Give info. about device is connected or not"

[9]

Figure 4: Bluetooth Modulator HC-05

17

3.3 MODES OF OPERATION OF HC-05

HC-05 Bluetooth serial comm. module has 2 modes: order-response mode and automated affiliation mode. In addition, there are a unit 3 work roles at the automated affiliation work mode. Once the module is at the automated affiliation mode, this'll trail default manner fixed finally to transfer info mechanically. The mode of module will be changed by dominant module PIO11 i/p level.

3.3.1 Serial module PINs:

3.3.1.1 PIO8 connects with light-emitting diode. Once the module is power on, light-emitting diode can flicker. Therefore the flicker vogue can specify that work mode is in use since completely diff mode has diff flicker measure.

3.3.1.2 PIO9 joins with crystal rectifier. This specifies whether or not the affiliation is made. Once the BT serial is paired, the light-emitting diode are going to be turned on. It means that the affiliation is made with success.

3.3.1.3 PIO11 is that the work mode switch. Once this port is i/p high, the mode can come to be order-response mode. Whereas this port is i/p low or up in the air , the mode can become auto affiliation mode.

3.3.1.4 The module will be reset if it's re-powered since there's a reset circuit at the module

3.3.2 Getting to the AT mode and Command mode

Firstly, we apply i/p low level to KEY. Then we give power to the module. Next, we i/p high level to the KEY. Then the module enters to AT mode. The baud rate is as same as the communication time, such as 9600 etc. To get to the command mode, we input low level to KEY and supply power to the module. Then the module will to command mode. It can be used for paring.

3.4 AT command [5]

Command	Return	Parameter	Description
AT	OK	None	Test
AT+VERSION?	+VERSION:<Param> OK	Param: Version number	Get the soft version
AT+ORGL	OK	None	Restore default status
AT+ADDR?	+ADDR: <Param> OK	Param: Bluetooth address	Get module Bluetooth address
AT+NAME=<Param>	OK	Param: Bluetooth device name	Set device's name
AT+NAME?	+NAME:<Param> OK	Param: Bluetooth device name	Inquire device's name
AT+ROLE=<Param>	OK	Param:0=Slave role; 1=Master role; 2=Slave-Loop role	Set module role
AT+ ROLE?	+ ROLE:<Param>	Param:0=Slave role; 1=Master role; 2=Slave-Loop role	Inquire module role
AT+UART=<Param>,<Param2>,<Param3>	OK	Param1: baud rate(bits/s); Param2: stop bit; Param3: parity bit	Set serial parameter

| AT+ UART? | +UART=<Param>,<Param2>,<Param3> OK | Param1: baud rate(bits/s); Param2: stop bit; Param3: parity bit | Inquire serial parameter |

Figure 4.1: Commands of HC-05

3.5 INTERFACING THE BLUETOOTH MODULE AND ARDUINO

Only four connection are made between Bluetooth module and Arduino Uno board. the voltage and ground of board and Bluetooth module are connected at the same place on the bread board. The Transmitting jot go to receiving jot Uno board & receiving jot goes to transmitting pin of Arduino.

[5]
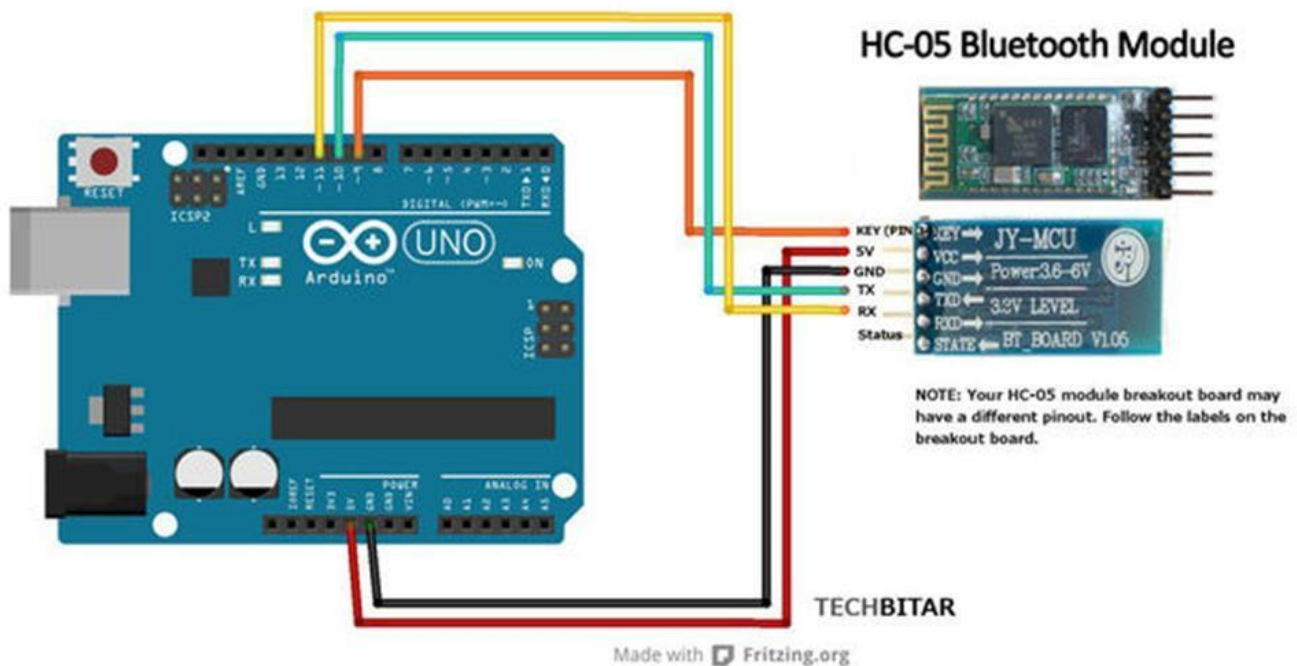
Figure 5: Interfacing of Bluetooth Module HC-05

CHAPTER 4: RELAYS

In our project relays are working as an electrical switch which on having high voltage set the device in ON state and in low state our device remain in OFF state. A separate relay is employed to each appliance in this project.

4.1 DEFINING RELAYS

Relays are similar to electric switches that ON and OFF devices electromechanically or electronically. Relays control one electrical circuit by opening and closing contacts in another circuit. Relays work as an electromagnet to mechanically operate a switch. There different operating principles. Nonetheless they differ in accordance of their use.

Relays have precise operating of switch, the thought applied to switches is additionally applied to relays, a relay is alleged to be switch one or additional pole. Every of whose contacts are often thrown chiefly in three ways that.

- Normally-Open contact (NO): Contact is termed build contact. This closes the circuitry once the relay gets activated and it disconnects the circuitry once relay is made inactive.

- Normally-Closed contact (NC): Off state is additionally called break contact. NC often opp. To NO because it closes the circuit once the relay gets inactive and disconnect the circuitry once relay gets activated.

- Change-over (CO)/Double-Throw (DT): These sorts of management's area unit won't to control 2 form of circuits. They're wont to management NO contacts and American state contacts with a standard terminal. In line with their varieties they're known as by their names break before build and build before break.
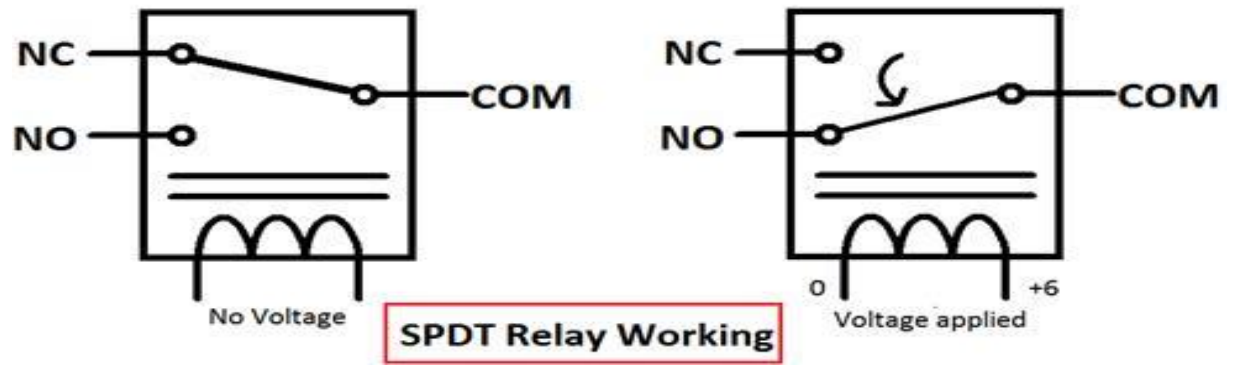
4.2 RELAY DESIGN [7]

Figure 6: Relay working

CHAPTER 5: TEMPERATURE and HUMIDITY SENSOR

DHT11 is a sensor that measure the content of temperature and humidity present in environment. It has joined digital signal outputs of temp. and moisture in present env.. It is an app. of digital modules assortment tech. and therefore temp & moisture sensing tech., confirms that the merchandise have large liableness ,and wonderful long-run permanence. This device comprises a resistive intellect of damp parts associate degreed temp. measuring maneuvers, and linked with a superior micro-controller.
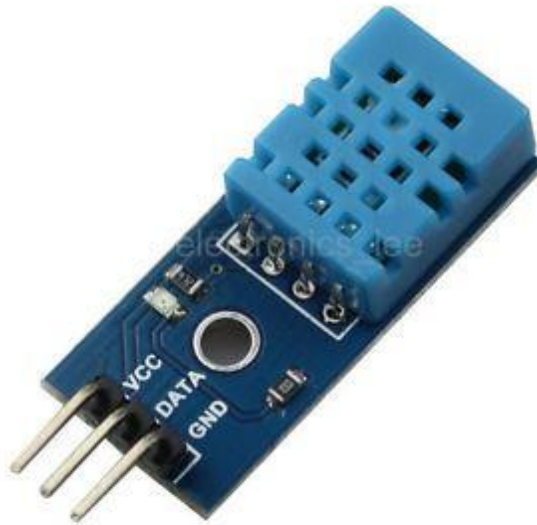
[9]

Figure 7: DHT11 sensor

5.1 Working Principle of Humidity Sensor

They measure the humedtiy of the area in which they're located. The sensor examine both components, wetness as well as temperature present in the area and expresses the moistness as a function of quantitative relation of wetness present in the env. to max. quantity which may be present within the env. at the present temp. With the inc. in temp. the air becomes warmer, it holds additional wetness, therefore there is change in humidity with change in temp.

A lot of humidness sensor uses electrical phenomenon activity to work out the quantity of wetness present in env. And these kinds of activities depends upon 2 electric conductors with an insulating chemical compound layer parturition b/w them to form an electric field b/w them. Wetness from the env. accumulates on the film and causes fluctuations within the volt. levels b\w 2 plates .This modification then regenerates into a digital activity of the air's ratio when taking env. temp. in consideration.

5.2 Parameter of DHT 11 [8]

Table 3: Parameter of DHT 11

Resolution	16Bit
Range	At 25^0 C $\pm$ 2^0C
Repeatability	$\pm$1%RH
Interchangeability	fully interchangeable
Sampling Period	>2 sec
Power Supply	5 volts direct current
Current Supplied	0.3 mille amps
Hys.	"< = $\pm$ 0.3" percentage relative humidity
Long Term Stability	"< = $\pm$ 0.5" percentage relative humidity per year
Time taken to respond	"1/e(63 percentage)of 25^0C 6sec" "1meter per second air 6sec"
Repeatability	"$\pm$0.2" degree Celsius

CHAPTER 6: SOIL MOISTURE SENSOR

The wet sensing element is employed to live the water content of soil. Once the soil has water shortage, the output of module output become high, else it will remain at loe level. This detector reminds the user to water their plants and continuously monitors the wetness content of soil. It's been widely utilized in agriculture, land irrigation and biology agriculture.
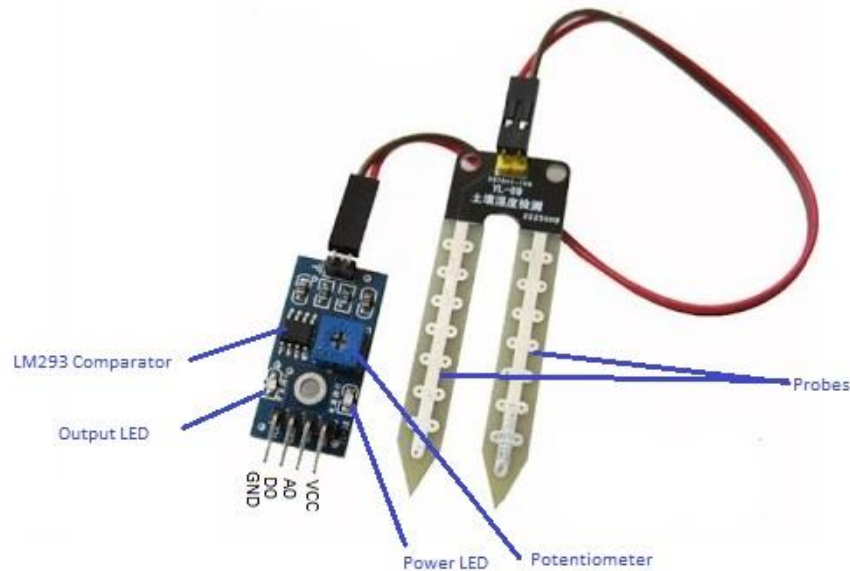

Figure 8: Soil and Moisture Sensor   [9]

6.1 Working Principle of Moisture Sensor

The Soil wet sensing element uses capacitance to live stuff permittivity of the encircling medium. In soil, stuff permittivity could be operate to measure quantity of water. Detector creates voltage which is directly proportional to non-conductor permitivity, so thequantity of water in the soil. Sensing element averages the amount of water over the complete area of detector. There's a two c.m. area of impact with relevancy the plane surface of sensing element, however it's very less or no sensitivity at intense edges. Soil wet sensing element is employed to live the loss of wet over time because of evaporation and plant uptake, measure ideal soil wet contents for several kinds of plants, observe soil wet content to manage irrigation in orangeries and improve bottle environmental science exp.

CHAPTER 7: THE ANDROID APP

INTRODUCTION

MIT App discoverer is associate degree intuitive, visual programming atmosphere that permits everybody to create absolutely purposeful application for mobile phones. The one who are using MIT Application discoverer will have straightforward initial application setting on and runs within but half-hour. And block-based instrument aids formation of advanced, great influence applicatons in considerably low period than ancient encoding env. MIT Application discoverer plan pursues to democratiz software package expansion by endowing individuals, particularly adolescents, to manoeuvre from technology consumption to technology creation. App discoverer for automaton is associate degree ASCII text file internet application originally provided by Google, and currently maintained by the Massachusetts Institute of Technology (MIT).

It permits newcomer to creating by mental acts to make software package application for the automation software. This use graphical crossing point, terribly kind of similar Scrape & therefore Star brand TNG crossing point, that permits persons to drag -&-drop things which can be seen to make and app. which will work on automaton expedients. In making Appliction Invertor thespian upon important previous analysis in instructional calculating.

7.1 HAS APPLICATION PAGE 1 BLUETOOTH

Page of the HAS app is attached with a Bluetooth client in which we can connect our app with Bluetooth module HC-05 and are home appliances are connected with the app through Bluetooth modulator which and app help us to ON and OFF the devices.

For Bluetooth communication the Massachusetts Institute of Technology app creator offers a part named Bluetooth consumer that is intercalary to the Bluetooth page. The Bluetooth consumer part consists of the following:

Properties

"Addresses and Names"

"Adrresses and names of paired Bluetooth devices"

"Available"

"Whether Bluetooth is Available or Not"

"Enabled

Whether Bluetooth is enabled or not

Highbytefirst

IsConnected

Secure

Whether to invoke SSP, which is supported on devicesV2.1 or higher.When working with embedded Bluetooth devices, this property may need to be set to False.

Events

None

Metods

Number BytesAvailableToReceive()

Returns an estimate of the number of bytes that can be eceived without blocking

Boolean Connect (text address)

Connect to the Bluetooth device with the specified address and the Serial Port Profile(SPP)

Returns true if the connection was successful

Boolean ConnectWithUUID(text address, text uuid)

Connect to the Bluetooth device with the specified address and UUID. Returns true if connection is successful.

Disconnect()

Disconnect from the connected Bluetooth device.

Boolean IsDevicePaired(text address)

Checks whether the Bluetooth device with the specified address is paired.

numberReceivesigned1ByteNumber()

Receive a signed 1-byte number from the connected Bluetooth device.

numberReceivesigne21ByteNumber()

Receive a signed 2-byte number from the connected Bluetooth device.

numberReceivesigned4ByteNumber()

Receive a signed 4-byte number from the connected Bluetooth device.

List ReceiveSignedBytes(number NumberOfBytes)

Receive multiple signed byte values from the connected Bluetooth device. If NumberOfBytes is less than 0, read until a delimiter Byte value is received.

Number ReceiveUnsigned1ByteNumber()

Receive an unsigned 1-byte number from the connected Bluetooth device

Number ReceiveUnsigned2ByteNumber()

Receive an unsigned 2-byte number from the connected Bluetooth device

Number ReceiveUnsigned4ByteNumber()

Receive an unsigned 4-byte number from the connected Bluetooth device

List ReceiveUnsignedBytes(number NumberOfBytes)

Receive multiple unsigned byte values from the connected Bluetooth device. If NumberOfBytes is less than 0, read until a delimiter Byte value is received.

Send1ByteNumber(text number)

Send a 1-byte number to the connected Bluetooth device.

Send2ByteNumber(text number)

Send a 2-byte number to the connected Bluetooth device.

SendBytes(list list)

Send a list of byte values to the connected Bluetooth device.

SendText(text text)

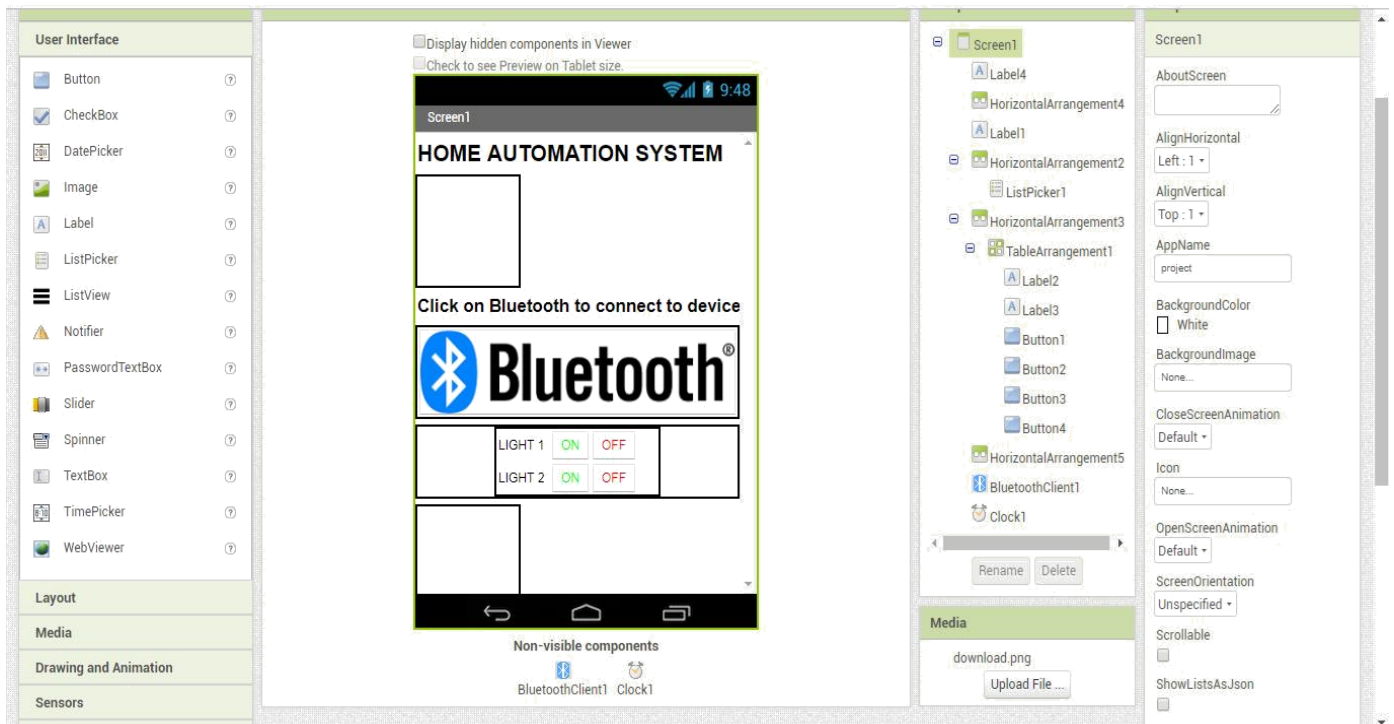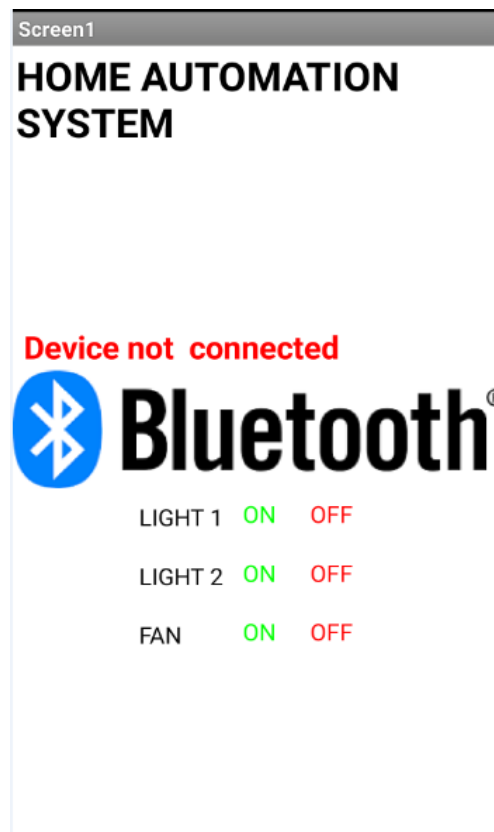Send text to the connected Bluetooth device".

Figure 9: MIT App Inverter

Figure 10: HAAS App

Under the tab detector we did like to feature another part- clock which is not visible to the user that has moment in time as interior clock in cellphone. This may set clock at regularity interims and performs time calcs., mani., and conv. On clicking ON for lightweight one a personality "A" is distributed from phone to the
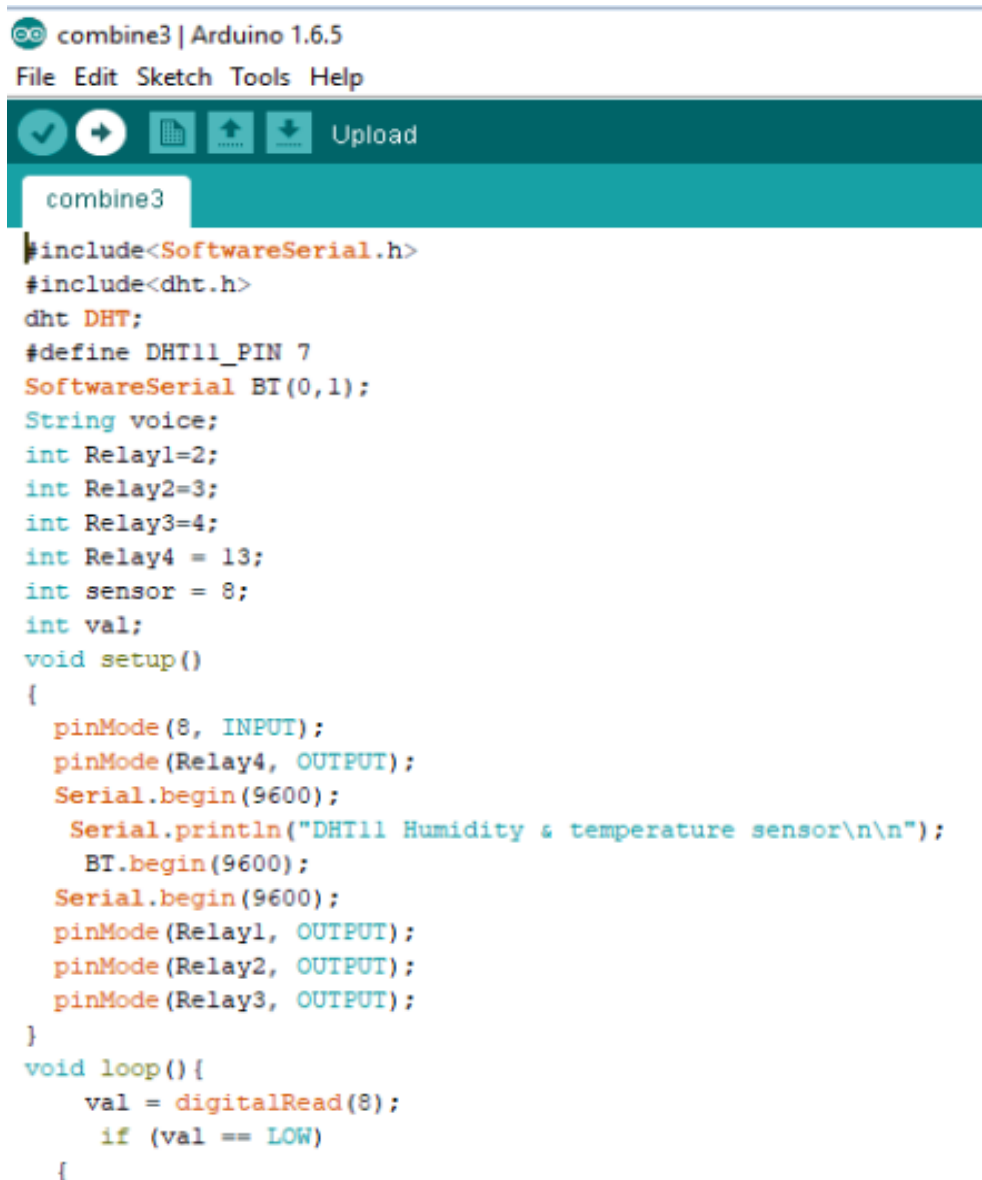
Bluetooth module The BT-module then sends it to Arduino board indicating the pin with respect to light 1 should be HIGH the code for every page of app is to be written in blocks that are mentioned in next chapter.

CHAPTER 8: CODE

INTRODUCTION

This chapter includes the coding used in the components in HAS

8.1 CODE FOR ARDUINO UNO

```
combine3 | Arduino 1.6.5
File  Edit  Sketch  Tools  Help

Upload

combine3

#include<SoftwareSerial.h>
#include<dht.h>
dht DHT;
#define DHT11_PIN 7
SoftwareSerial BT(0,1);
String voice;
int Relay1=2;
int Relay2=3;
int Relay3=4;
int Relay4 = 13;
int sensor = 8;
int val;
void setup()
{
  pinMode(8, INPUT);
  pinMode(Relay4, OUTPUT);
  Serial.begin(9600);
   Serial.println("DHT11 Humidity & temperature sensor\n\n");
    BT.begin(9600);
  Serial.begin(9600);
  pinMode(Relay1, OUTPUT);
  pinMode(Relay2, OUTPUT);
  pinMode(Relay3, OUTPUT);
}
void loop(){
    val = digitalRead(8);
     if (val == LOW)
    {
```

combine3

```
     digitalWrite(Relay4, LOW);
  }
  else
  {
    digitalWrite(Relay4, HIGH);
  }
  delay(400);
int chk = DHT.read11(DHT11_PIN);
Serial.println(" Humidity " );
Serial.println(DHT.humidity, 1);
Serial.println(" Temparature ");
Serial.println(DHT.temperature, 1);
delay(2000);
 while(BT.available()){
    delay(10);
    char c = BT.read();
    voice += c;
```

File Edit Sketch Tools Help

Upload

combine3

```
    Serial.print(voice);
  }
  if(voice == "A")
  {
    digitalWrite(Relay1, HIGH);
  }
  else if(voice == "B")
  {
    digitalWrite(Relay1, LOW);
  }
  else if(voice == "C")
  {
    digitalWrite(Relay2, HIGH);
  }
  else if(voice == "D")
  {
    digitalWrite(Relay2, LOW);
  }
  else if(voice == "E")
  {
    digitalWrite(Relay3, HIGH);
  }
  else if(voice == "F")
  {
    digitalWrite(Relay3, LOW);
  }
  voice="";
}
```

8.2 CODE FOR HAS APP: BLUETOOTH

Each page of the app has a unique block of codes. The block for the Bluetooth screen is
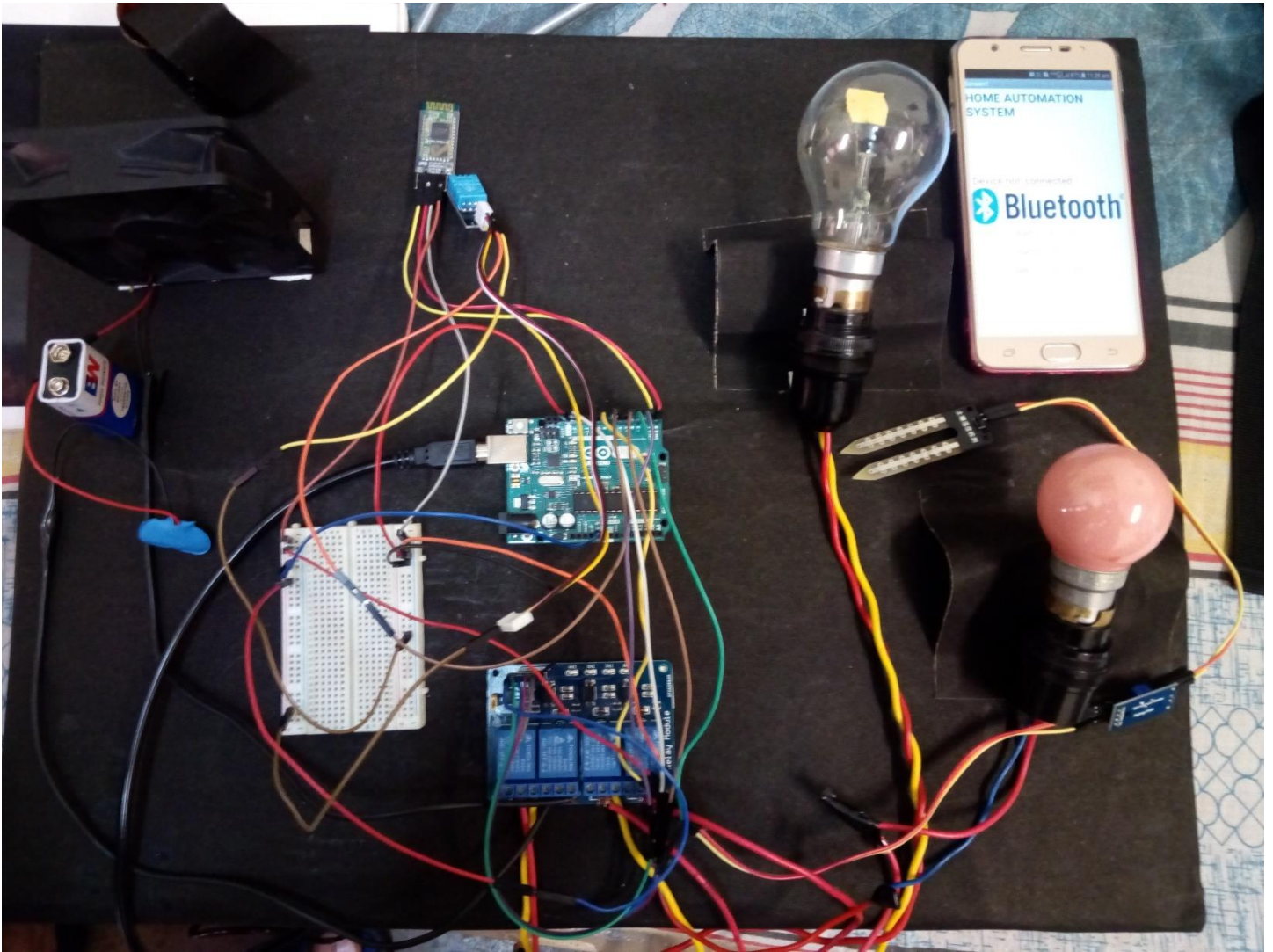
CHAPTER 9: Hardware Implementation
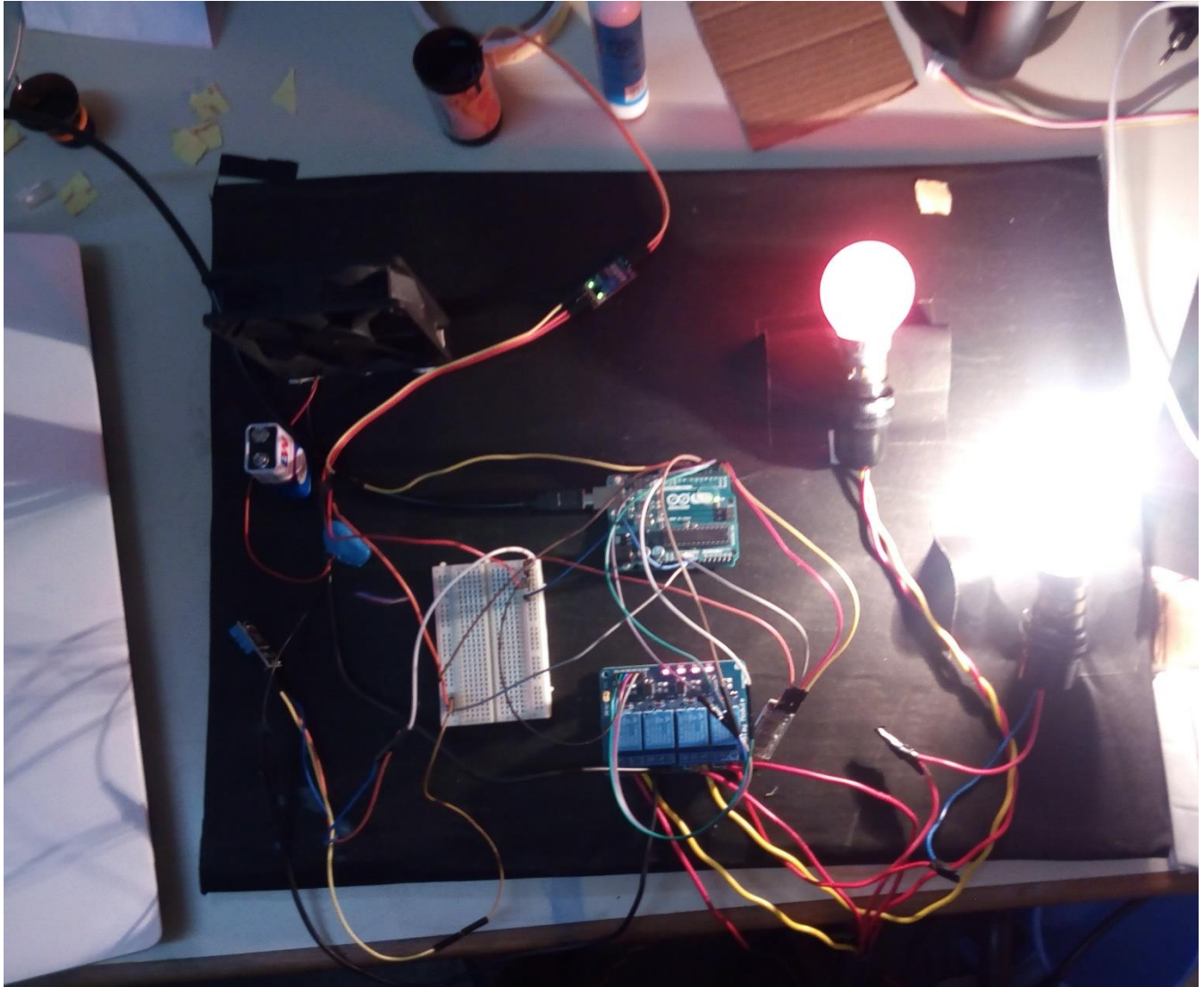
Figure 12: Hardware Implementation

References

[1] R. Piyare and M. Tazil, "Home automation system using cell phone". Published in 15th International Symposium.

[2] M. Van Der Werff, " A Mobile- based Home Automation System". Published in Massey University, New Zealand.

[3] bluespeedav/blog/item/7-greatest-advantages-of-smart-home-automation.

[4] econais.com/application/smart-home-application.

[5] iotevolutionworld/m2m/articles/376816-history-smart-homes

[6] Nosmut.com

[7] Circuit Study.com

[8] Wikipedia.com

[9] Googleimages.com

[10] Storearduuino.cc

[11] Appinventor.mit.edu