PROJECT REPORT

OF

" INTERNET OF THINGS / SMART ROOM "

Delhi **T**echnological **U**niversity

Submitted in the partial fulfillment of the Degree of bachelor of Technology
In
Software Engineering

SUBMITTED BY :-
Partner 1 : Shubham (2K19 / SE / 119)
Partner 2 : Vikash Kumar (2K19 / SE / 147)

GUIDED BY :-
Mr. Lokesh Gautam

DELHI TECHNOLOGICAL UNIVERSITY

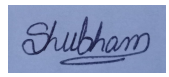
(Formerly Delhi College of Engineering)

Bawana Road, Delhi - 110042

CANDIDATE'S DECLARATION

We, (Shubham (2K19/SE/119), Vikash Kumar (2K19/SE/147)) students of B.Tech (Software Engineering), hereby declare that the project dissertation titled, "Internet of things / Smart Room" which is submitted by us to Department of Software Engineering, Delhi Technological University, Delhi in partial fulfillment of the requirement for the award of degree of Bachelor of Technology, is original and not copied from any source without citation. This work has not previously formed basis for award of any degree, diploma associateship, fellowship or any other similar title or recognition.

Date : November 21, 2020



Shubham (2K19/SE/119)

Place : Delhi Technological University, Delhi

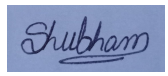
Vikash Kumar

(2K19/SE/147)

ACKNOWLEDGEMENT

We, (Shubham (2K19/SE/119), Vikash Kumar (2K19/SE/147))
express our sincere gratitude to Mr. Lokesh Gautam for his valuable guidance and timely suggestions during the entire duration of our dissertation work, without which this work would have not been possible. I would like to convey my deep regards to all faculty members of Department of Software Engineering, who have bestowed their great efforts and guidance at appropriate time without which it would have very difficult on out part to finish this work. I would to thanks my friends for their advise and pointing out the mistakes.

Vikash Kumar
(2K19/SE/147)



Shubham
(2K19/SE/119)

INDEX

ABSTRACT

This project is about Internet of things .As with the growing technology various devices are being automated . Electrical devices used in our house also needs upgradation. This project deals with the automation non -smart devices such fan ,switches etc . In this project we have used Arduino as the brain of our project. There are various other devices such as Bluetooth ,relays to achieve the desired result. We have made the device. The device is capable to control 9 different devices at a single time, but in this project we have used four different devices and in working model we have use two different devices because of safety, easy handling and demonstration of Technology. With our device, automation of various electrical devices such as fan light bulb will become very easy.

OBJECTIVE

The objective of our project is to achieve automation of various electrical devices present in one's room fan, bulb etc.We want to control these devices through our smartphone, thus eliminating the need to physically move to control the switches.

INTRODUCTION

This project is about Internet of things using Arduino Uno. Using our device the user can control various electrical devices like fans, bulbs and various other devices through his/her smartphone. Whenever the user wants to ON/OFF any devices he/she can just touch the buttons on the smartphone. The current state of the device is shown on the smartphone. This device allow the user to control their appliances from a distance.

SYSTEM

Existing System :

The owner has to manually control their appliances through switches .User has to physically move to the location of switch.

New System :

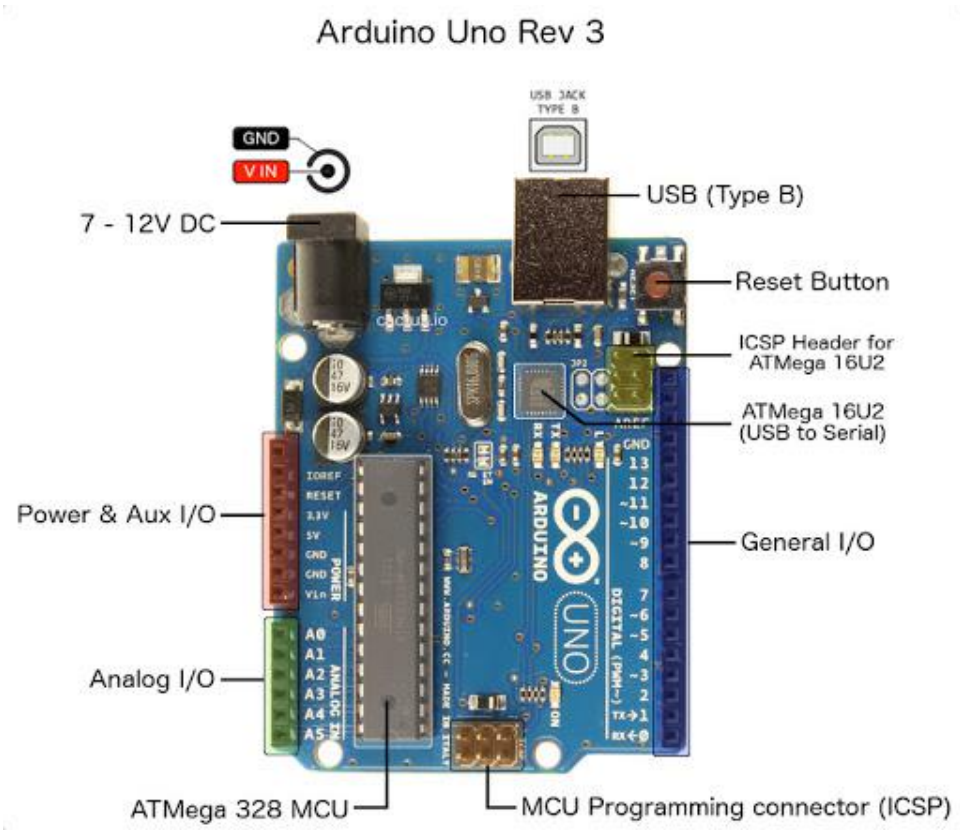
The owner can control their appliances through their smartphone .User don't need to move to control their appliance ..

Devices Used

1. Arduino Uno :-

Arduino Uno [6] is a microcontroller board which is based on the ATmega328 series controllers and has an IDE (Integrated Development Environment) for writing, compiling and uploading codes to the microcontroller. It has 14 digital input and output pins (of which 6 are PWM) and 6 analogue inputs for communication with the electronic components such as sensors, switches, motors and so on.

It also has 16 MHz ceramic resonators, a USB connection jack, an external power supply jack, an ICSP (in-circuit serial programmer) header, and a reset button. Its operating voltage is 5v, input voltage 7 to 12v



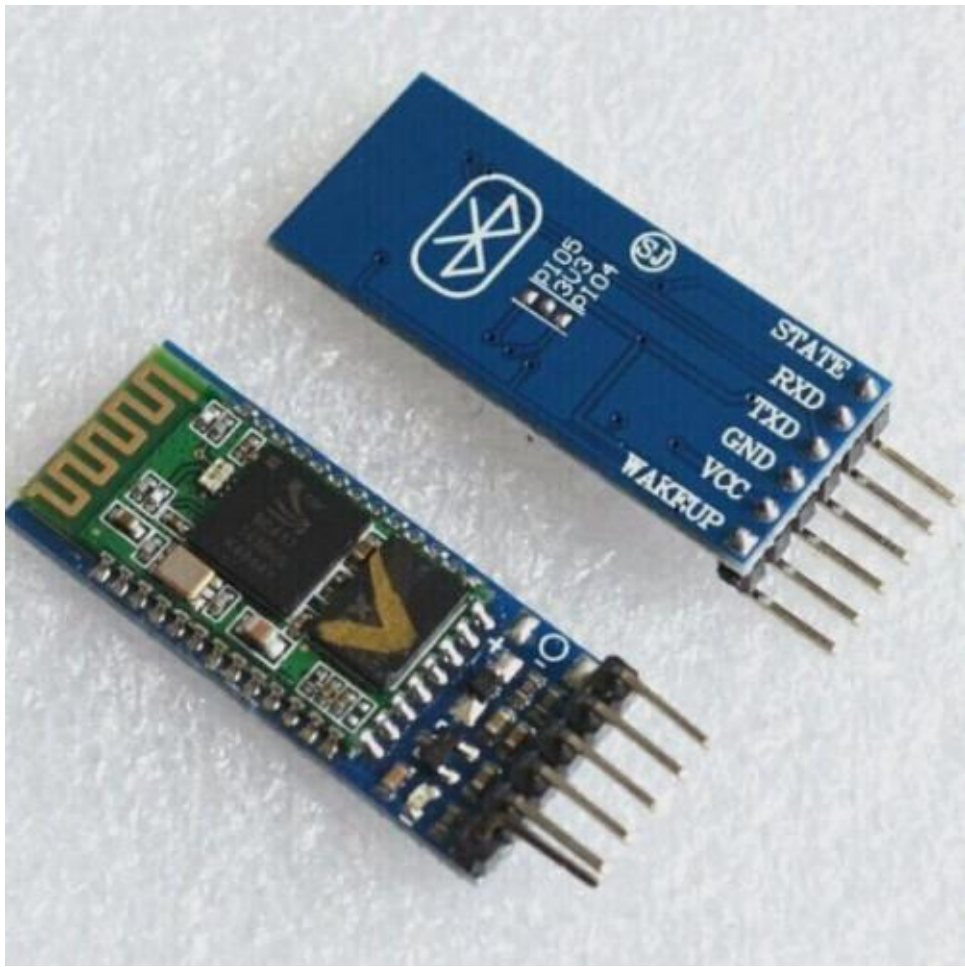
2. Bluetooth HC-05 :-

HC-05 Bluetooth Module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Its communication is via serial communication which makes an easy way to interface with controller or PC. HC-05 Bluetooth module provides switching mode between master and slave mode which means it able to use neither receiving nor transmitting data.

Specification :

1. Model: HC-05
2. Input Voltage: DC 5V

3. Communication Method: Serial Communication
4. Master and slave mode can be switched.

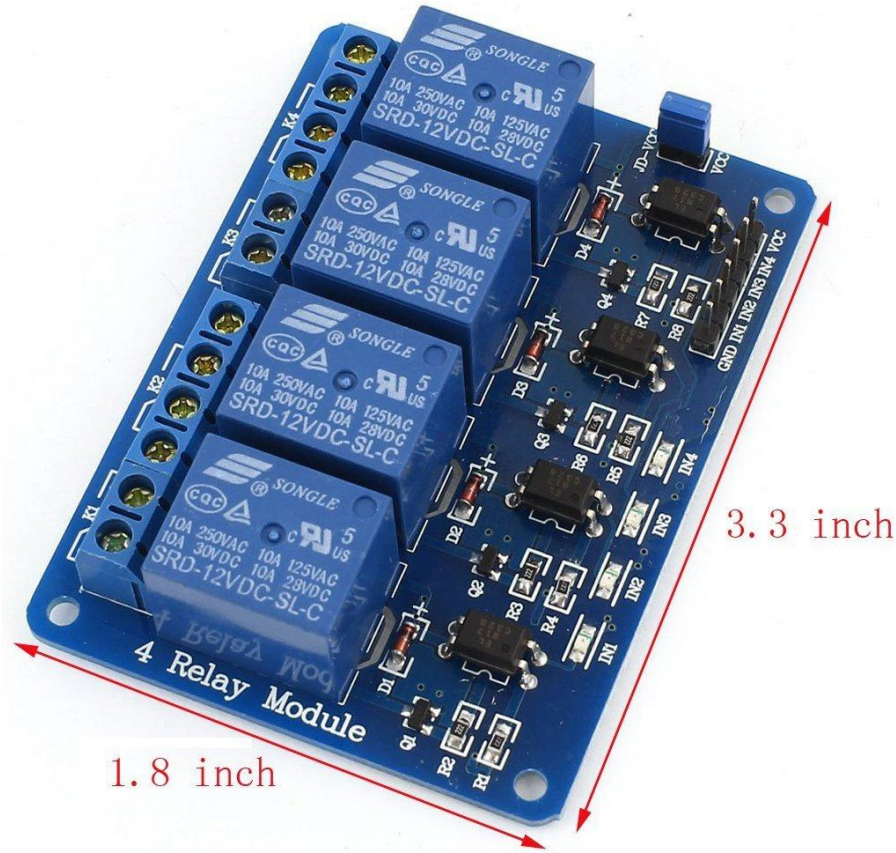


3. Relay 4 Channel :-

The 4 Channel Relay Module is a convenient board which can be used to control high voltage, high current load such as motor, solenoid valves, lamps and AC load. It is designed to interface with microcontroller such as Arduino, PIC and etc. It also comes with a LED to indicate the status of relay.

Specification:

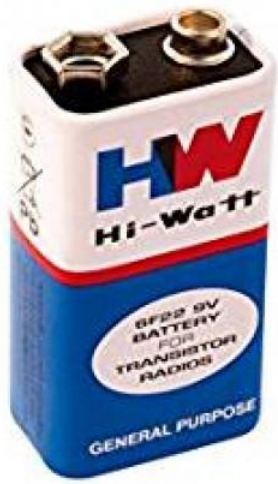
- Digital output controllable
- Compatible with any 5V microcontroller such as Arduino.
- Rated through-current: 10A (NO) 5A (NC)
- Control signal: TTL level
- Max. switching voltage 250VAC/30VDC



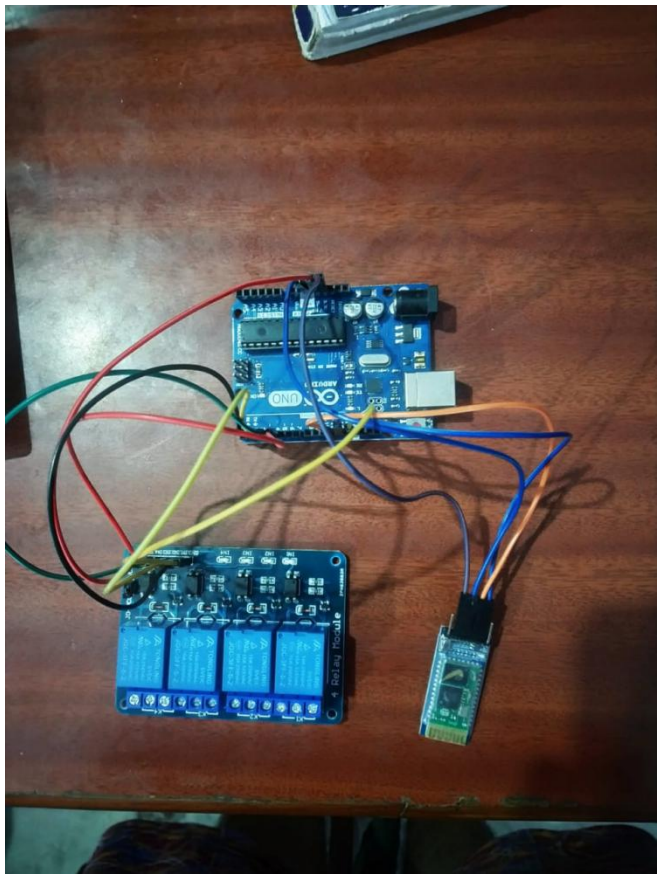
4. BATTERY :-

The nine-volt **battery**, or **9-volt battery**, is a common size of **battery** that was introduced for the early transistor radios. It has a rectangular prism shape with rounded edges and a polarized

snap connector at the top. This type is commonly used in walkie-talkies, clocks and smoke detectors.



CIRCUIT



Connection Between Arduino and Relay :-

1. VCC of relay is Connected to the 5V pin in Arduino .
2. GND of relay to GND of Arduino.
3. pin IN1 ,IN2,IN3,IN4 of relay to pin 2,3,4,5 of Arduino respectively.

Connection between Bluetooth and Arduino :-

1. TX pin of Bluetooth to pin 11 of Arduino.
2. RX pin of Bluetooth to pin 10 of Arduino.
3. GND of Bluetooth to GND of arduino
4. VCC of Bluetooth to 3.3V pin of Arduino .

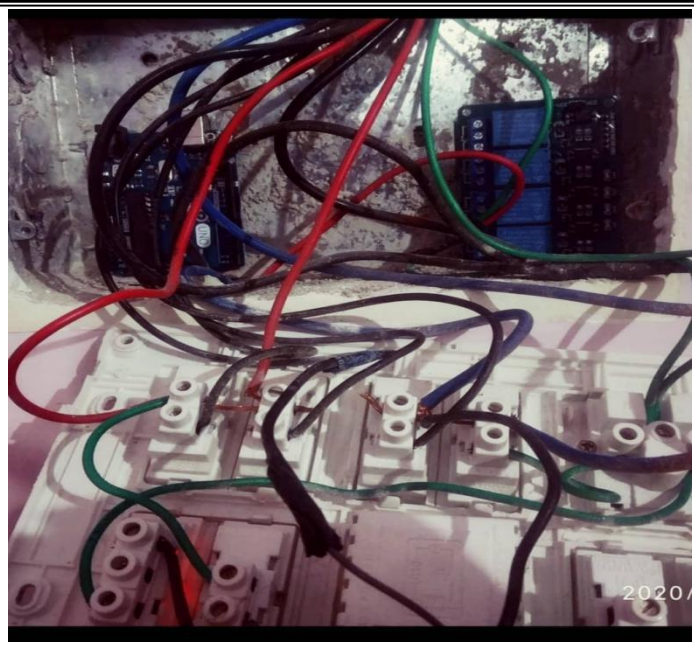
Connection between Battery and Arduino :-

1. The positive terminal of Battery to VCC of Arduino.
2. Negative terminal of Battery to GND of Arduino .

Installation of Device

I will be installing this device in in my room

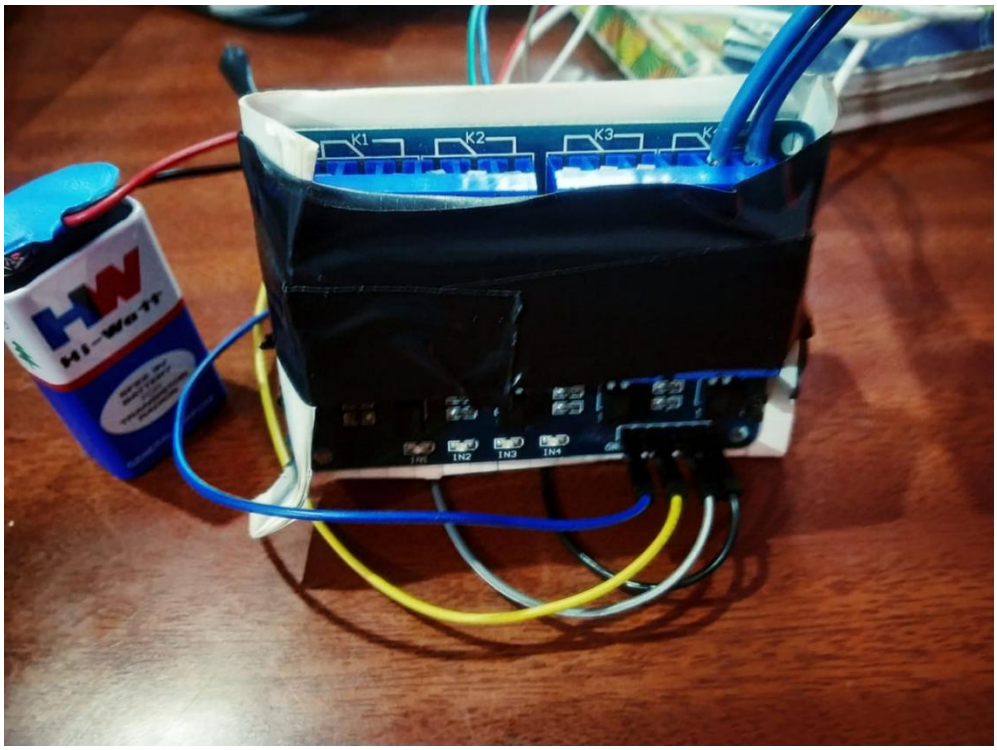
1. First we need to understand the wiring of switch board. In general there is one live wire that feeds the current and each neutral wire for each electrical devices.



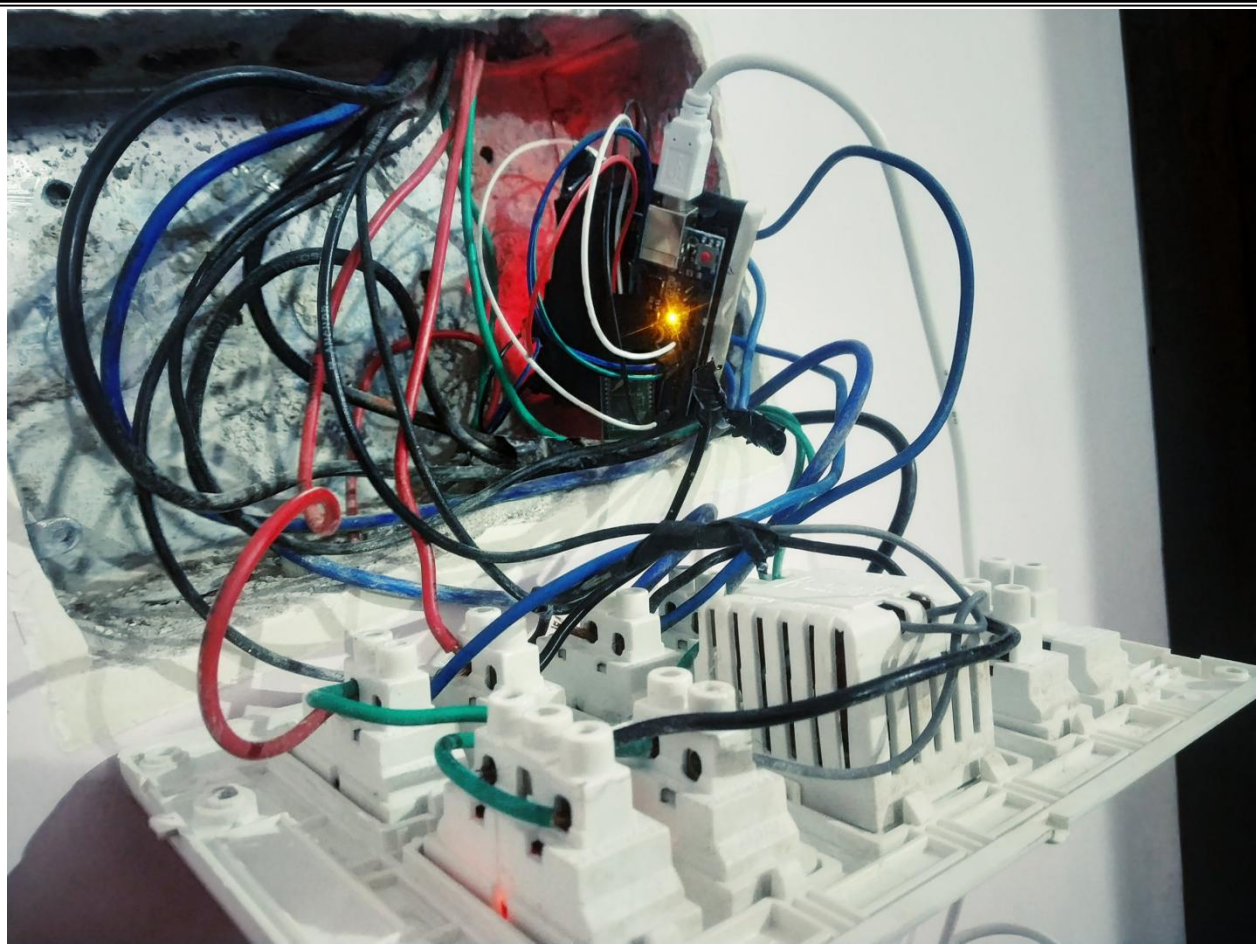
2. We will be connecting the relays to the neutral wires.
3. There are two terminals in the relay and two terminals in the switch.In the switch we will take its neutral point and connect to the positive terminal of the relay .

we will connect the neutral wire (from the electrical device) to the positive terminal of the relay.

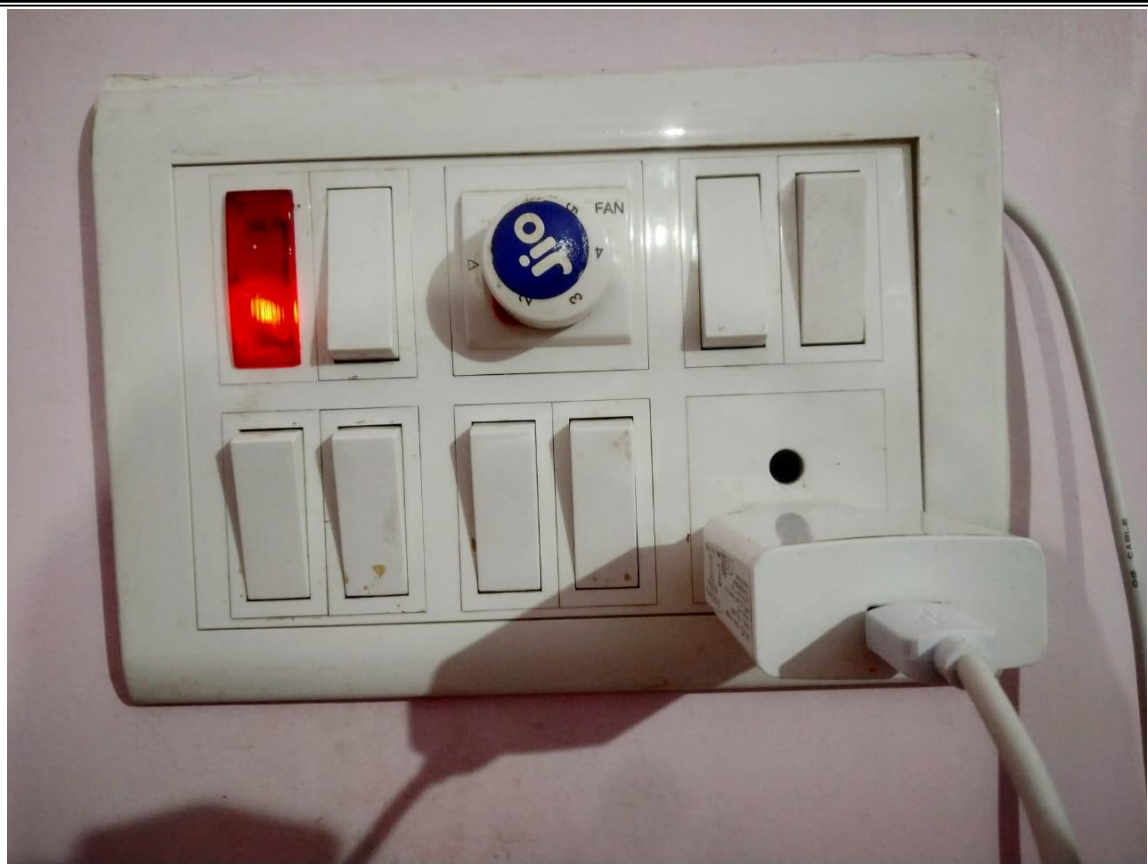
4. We made connection to switches to avoid wastage of switches and also to establish two way control one through switches other through android app.
5. The switch will always be in on state.
6. In the above way we have to make connections for rest of the electrical devices.
7. Another problem we faced while installation was that there was very small size available to properly fit both the Arduino and the relay. So we sandwiched them together in order to minimize space occupied by them.



8. For the power source we are using a 2 ampere 5-volt standard mobile charger as the battery drained out very quickly. Removing battery is of great use because the owner need not to change the battery every time it runs out.



Before Installation



After Installation

WORKING

1. Arduino is programmed with our code . It receives command from Bluetooth hc-05. It analyze the command and take necessary actions.

2. Arduino is in contact with user's smartphone via Bluetooth hc05.

3. We are using Arduino Bluetooth app to give command to Arduino wirelessly.

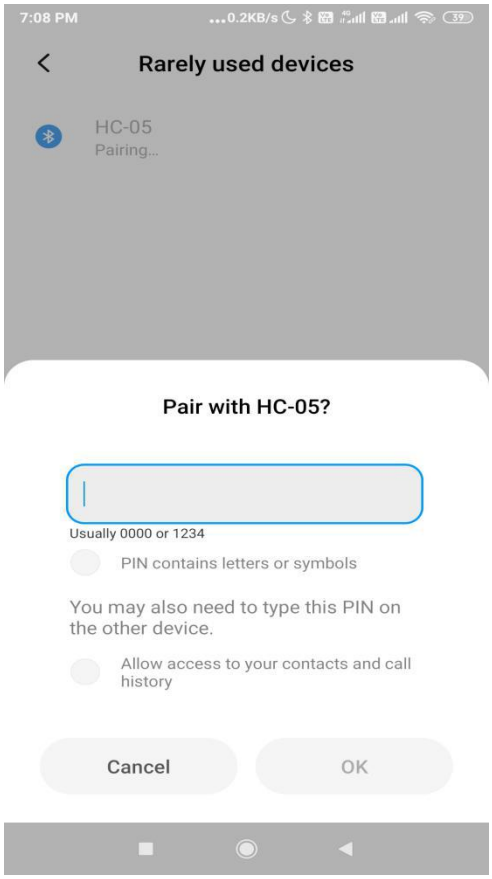
4. When a user presses a button on his smartphone app the user's device sends a command to Bluetooth hc-05.

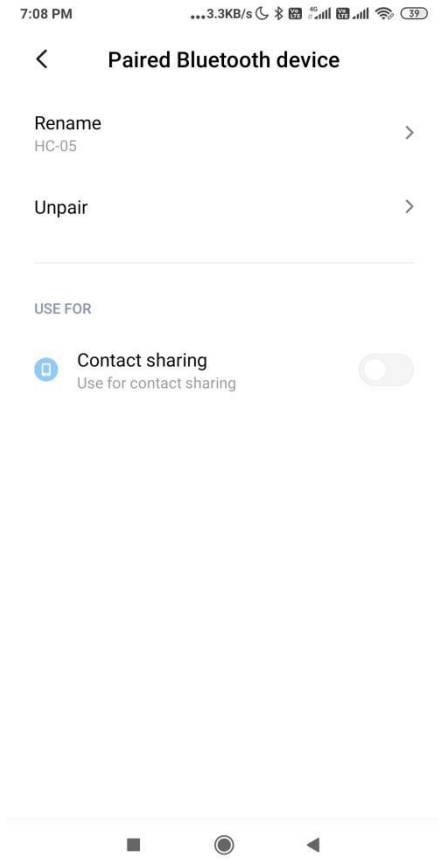
4. The Bluetooth hc-05 transfer that command to Arduino. The Arduino analyzes the command and take the necessary action as requested by the user.

5. VIDEO OF OUR WORKING
https://drive.google.com/file/d/10NYa58_PKy77dge6agvZDADqAzFWLuYX/view?usp=sharing

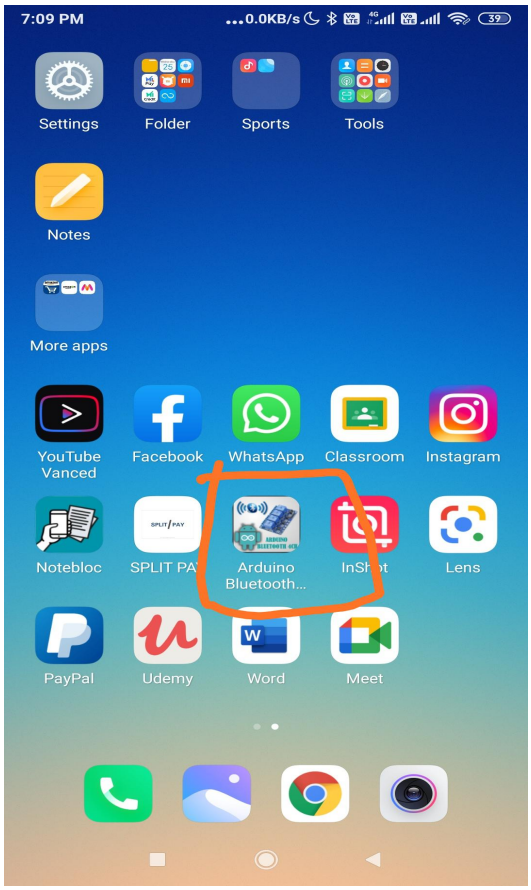
HOW TO USE OUR DEVICE

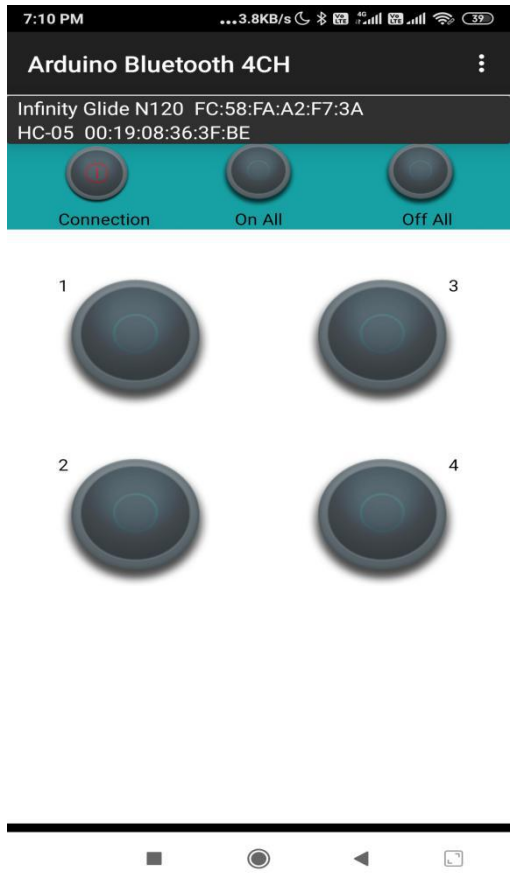
1. First of all the owner need to switch on the Arduino using the charger.
2. Open the Bluetooth settings in the smartphone, click on refresh button and pair with HC-05
(password 1234)





3. Now open Arduino Bluetooth app .Click on connection button. wait for establishing the connection between Smartphone and the Bluetooth hc-05.

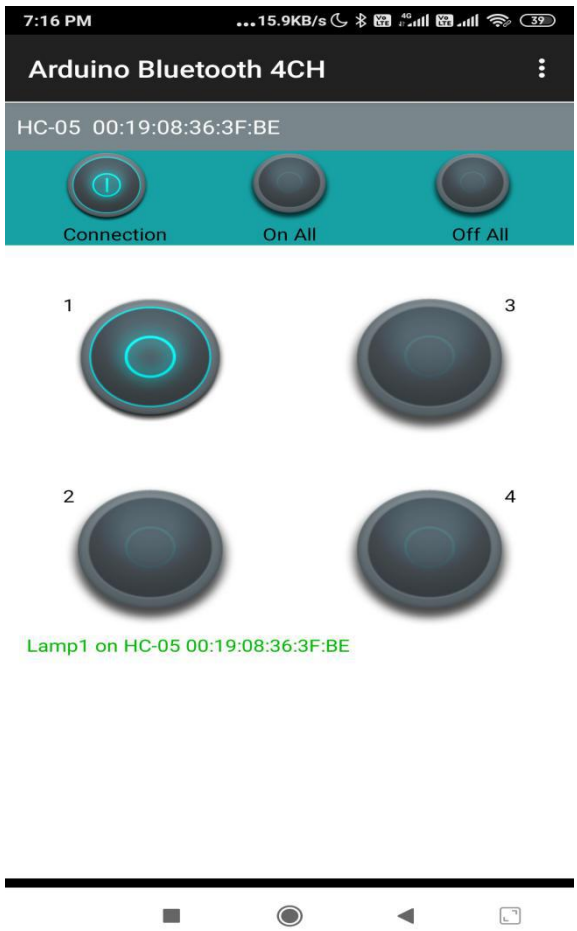




4.After successful connection green colour text will appear at the bottom.

5.There are total 6 buttons in the app:

- One button for connection.One button to switch on all connections.
- Connection ,one button to switch off all connections
- Four different buttons each of these buttons will control one electrical device.



5. The user just needs to touch button on the smartphone to switch on/off the corresponding connected device.

What's Innovative ?

1.This is the future . In the Future home automation will be a normal thing .
2. This device shows the potential and power of automation .
3. Various product available in the market are very expensive are not reliable and have limited number of device it can connect .
For eg .

These device can connect only one electrical device but with our project user can connect 8 different device simultaneously.
The total cost our project was around 1200 rupees.

Uses

1. This device is very useful for physically handicapeed people as they will need not move to control switches .
2. It will be a great tool for old people.
3. In general it will provide control and convenience to the user .
4. As the device is easy to use wasting of electricity will be minimized.

5.Will help the user to track its electricity bill and find out how much each device each device uses electricity.

CONCLUSION

Performance device is very motivating. I am using this device for past couple of days and I am very happy with the performance. As its winter season so we all are in warm quilt. It is a real life situation before going to sleep I have to switch off all the bulbs in my room as a switches are in opposite corner I have to move to switch off the bulbs, it is very irritating for me to leave the warm quilt and go to switch off the bulb ,but with this device I can switch off my bulbs lying on the bed using the smartphone.
It is such a great tool for me I can only imagine how much it will help physically handicapped and old age people who have to move in order to control switches.

Future Scope

Home Automation is our future . It will become a common thing in future. Every household will have these types of app .Much more advanced app will be built.User will be able to control the devices through voice commands.

REFERENCES :-

1.https://simple.wikipedia.org/wiki/Electronics
2.https://stackoverflow.com/
3.https://www.arduino.cc/en/Main/ArduinoBoardUnoSMD
4.https://www.youtube.com/watch?v=fJWR7dBuc18&list=PLGs0VKk2DiYw-L-RibttcvK-WBZm8WLEP
5.https://www.electroboom.com/

APPENDIX

CODE

```
#include <SoftwareSerial.h>
SoftwareSerial mySerial(10, 11);

//Pin10 RX , Pin 11 TX connected to--> Bluetooth
TX,RX

#define relay1 2
#define relay2 3
#define relay3 4
#define relay4 5
char val;

void setup()
{
      pinMode(relay1,OUTPUT);
      27
      pinMode(relay2,OUTPUT);
      pinMode(relay3,OUTPUT);
      pinMode(relay4,OUTPUT);
      digitalWrite(relay1,HIGH);
      digitalWrite(relay2,HIGH);
      digitalWrite(relay3,HIGH);
      digitalWrite(relay4,HIGH);
      mySerial.begin(9600);
     Serial.begin(9600);
}

void loop()
{
      //chek data serial from bluetooth android App
      if( mySerial.available() >0 )
```

```
        {
                val = mySerial.read();
                Serial.println(val);
                28
}


//Relay is on
if( val == '1' )
{
        digitalWrite(relay1,LOW);
}
else if( val == '2' )
{
        digitalWrite(relay2,LOW);
}
else if( val == '3' )
{
        digitalWrite(relay3,LOW);
}
else if( val == '4' )
{
        digitalWrite(relay4,LOW);
}
//relay all on
else if( val == '9' )
{
        digitalWrite(relay1,LOW);
        digitalWrite(relay2,LOW);
        digitalWrite(relay3,LOW);
        29
        digitalWrite(relay4,LOW);
}
//relay is off
else if( val == 'A' )
{
        digitalWrite(relay1,HIGH);
}
```

```
else if( val == 'B' )
  {
      digitalWrite(relay2,HIGH);
}
else if( val == 'C' )
{
      digitalWrite(relay3,HIGH);
}
else if( val == 'D' )
{
      digitalWrite(relay4,HIGH);
}
//relay all off
else if( val == 'I' )
{
      digitalWrite(relay1,HIGH);
      digitalWrite(relay2,HIGH);
      digitalWrite(relay3,HIGH);
      30
      digitalWrite(relay4,HIGH);
}
}
```

VIDEO OF OUR WORKING:

https://drive.google.com/file/d/10NYa58_PKy77dge6agvZDADqAzFWLuYX/view?usp=sharing