

An Embedded Project

On

HOME AUTOMATION USING ARDUINO

By

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Abstract:

As technology is advancing so houses are also getting smarter. Modern houses are gradually shifting from conventional switches to centralized control system, involving remote controlled switches. Presently, conventional wall switches located in different parts of the house makes it difficult for the user to go near them to operate. Even more it becomes more difficult for the elderly or physically handicapped people to do so. Remote controlled home automation system provides a most modern solution with smart phones. In order to achieve this, a Bluetooth module is interfaced to the Arduino board at the receiver end while on the transmitter end, a GUI application on the cell phone sends ON/OFF commands to the receiver where loads are connected.

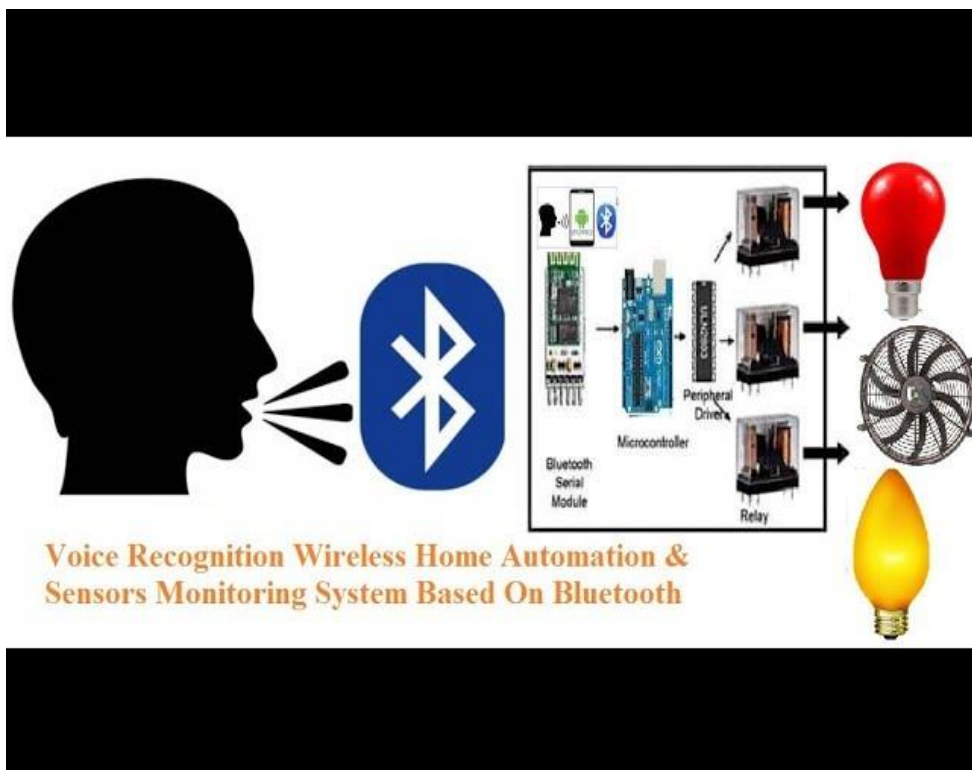
Introduction:

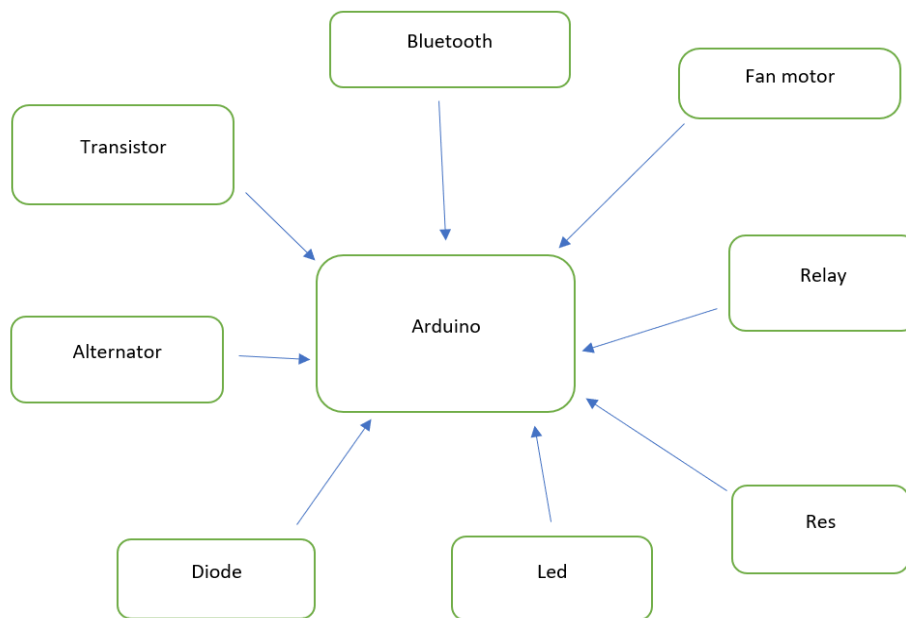
Nowadays, we have remote controls for our television sets and other electronic systems, which have made our lives real easy. Have you ever wondered about home automation which would give the facility of controlling tube lights, fans and other electrical appliances at home using a remote control? Off-course, Yes! But, are the available options cost effective? If the answer is No, we have found a solution to it. We have come up with a new system called Arduino based home automation using Bluetooth. This system is super-cost effective and can give the user, the ability to control any electronic device without even spending for a remote control. This project helps the user to control all the electronic devices using his/her smartphone. Time is a very valuable thing. Everybody wants to save time as much as they can. New technologies are being introduced to save our time. To save people's time we are introducing Home Automation system using Bluetooth . With the help of this system you can control your home appliances from your mobile phone. You can turn on/off your home appliances within the range of Bluetooth.

Apparatus:

- 1)Arduino uno
- 2)Channel relays(5v)
- 3)Bluetooth modules
- 4)Led- Yellow
- 5)Alternator
- 6)Smartphone(Bluetooth enabled)
- 7)Diode
- 8)Transistor
- 9)Motor
- 10)Res

Block Diagram:

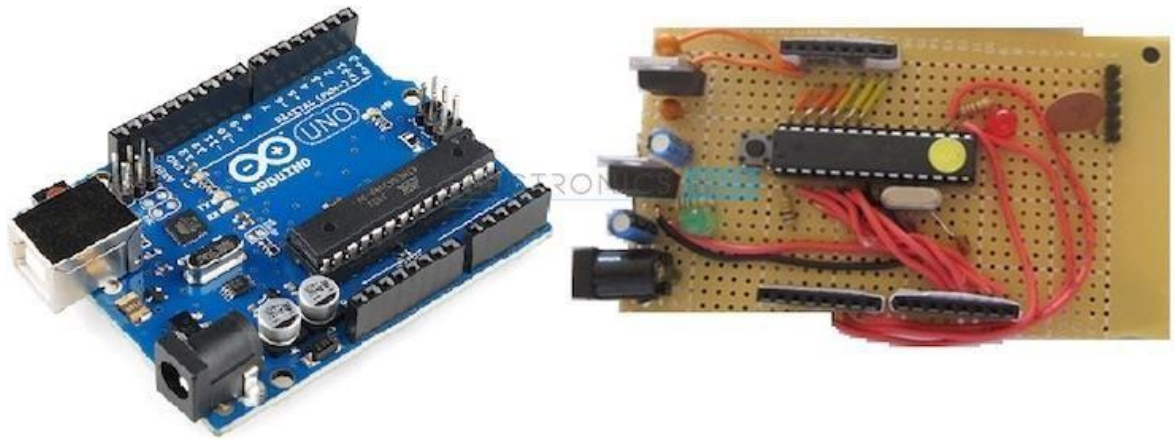




1 .Introduction to Arduino board:

A decade ago, working around electronics involved knowledge in physics and math, expensive lab equipment, a laboratory type setup and important of all, love for electronics. But the picture has changed over the decade or so where the above-mentioned factors became irrelevant to work around electronics except for the last part: love for electronics.

There are many reasons which made this possible like rapid growth in the field of information technology, lower cost of electronic components and equipment and widespread availability of the internet.



Arduino boards are generally based on microcontrollers from Atmel Corporation like 8, 16 or 32 bit AVR architecture based microcontrollers. The important feature of the Arduino boards is the standard connectors. Using these connectors, we can connect the Arduino board to other devices like LEDs or add-on modules called Shields. The Arduino boards also consist of on board voltage regulator and crystal oscillator. They also consist of USB to serial adapter using which the Arduino board can be programmed using USB connection.

In order to program the Arduino board, we need to use IDE provided by Arduino. The Arduino IDE is based on Processing programming language and supports C and C++. There are many types of Arduino boards available in the market but all the boards have one thing in common: they can be programmed using the Arduino IDE. The reasons for different types of boards are different power supply requirements, connectivity options, their applications etc.

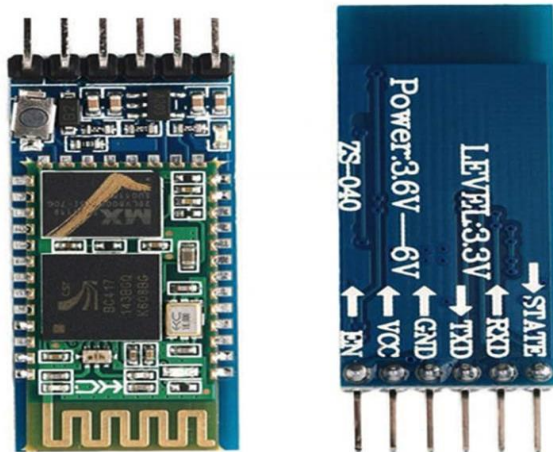
2. Relay Module:

We can control high voltage electronic devices using relays. A Relay is actually a switch which is electrically operated by an electromagnet. The electromagnet is activated with a low voltage, for example 5 volts from a microcontroller and it pulls a contact to make or break a high voltage circuit



3. Bluetooth Module(HC-05 Bluetooth Module)

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. It is used to connect smart phone with schematic and perform ON/OFF operation by voice control.



4. Transistor:

Transistor acts like a switch to control when a high signal is outputted to the power switch tail.

5.Alternator:

It is used to give power supply to the components.

6.Diode:

It acts as a one-way switch.

Code:

```
String voice;
void setup() {
  Serial.begin(9600);
  pinMode(6, OUTPUT);
  pinMode(5, OUTPUT);
  pinMode(4, OUTPUT);
}

void loop() {
  while(Serial.available()){
    delay(3);
    char c = Serial.read();
    voice+=c;}

  if(voice.length() >0){
    Serial.println(voice);
    if(voice == "light on")
      {digitalWrite(6, HIGH);}
    else if(voice == "light off")
      {digitalWrite(6, LOW);}
    else if(voice == "fan on")
      {digitalWrite(5, HIGH);}
    else if(voice == "fan off")
      {digitalWrite(5, LOW);}
    else if(voice == "night lamp on")
      {digitalWrite(4, HIGH);}
    else if(voice == "night lamp off")
      {digitalWrite(4, LOW);}
    else if(voice == "all on")
```

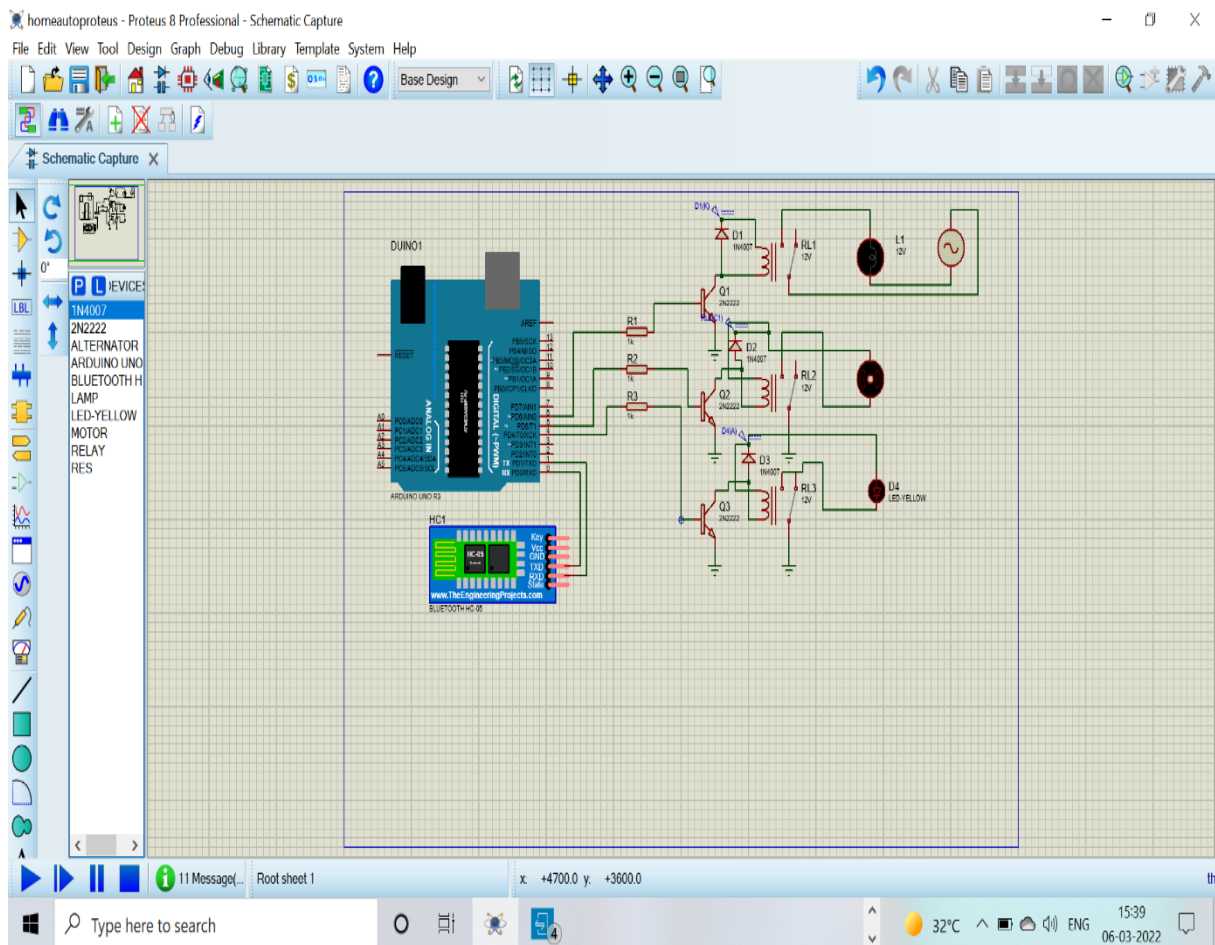
```

{digitalWrite(4, HIGH);
 digitalWrite(5, HIGH);
 digitalWrite(6, HIGH);}
else if(voice == "all off")
{digitalWrite(4, LOW);
 digitalWrite(5, LOW);
 digitalWrite(6, LOW);}
voice = "";}
}

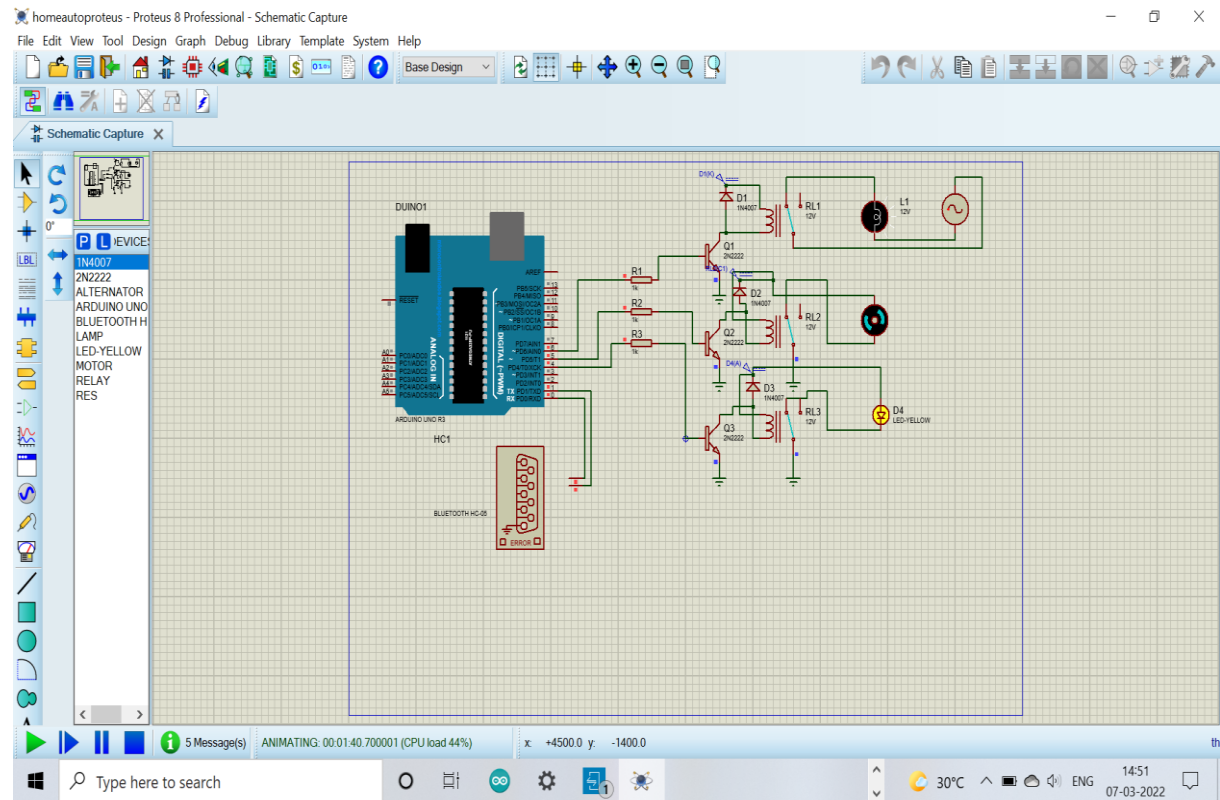
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Output:

Before running:



After running:



Conclusion:

In this project we came to know the working of Arduino, its hardware / software features and its applications as to where it is currently being used. We have also learnt how to write sketches for Arduino in its own IDE (software). Developing new ideas with Arduino is endless. The possibilities of using an Arduino to learn and develop new ideas are infinite.

Though it does have its own limitations, it is a great tool that can be used in learning.