DECLARATION

I hereby declare that the project entitled, "**Using of Arduino and Bluetooth to control the LED through Android App" done at Guru Nanak Khalsa College,** has not been in any case duplicated to submit to any other university for the award of any degree. To the best of my knowledge other than me, no one has submitted to any other university. The project is done in partial fulfilment of the requirements for the award of degree of BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY) to be submitted as final semester project as part of our curriculum.

SMRUTI LOHAR

ACKNOWLEDGEMENT

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At last but not the least I want to thank all of my friends who helped/treasured me out in completing the project, where they all exchanged their own interesting ideas, thoughts and made this possible to complete my project with all accurate information. I wish to thank my parents for their personal support or attention who inspired/encouraged me to go my own way.

Using Arduino and Bluetooth Module to control LED through Android App

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Introduction:

In the era of smart technology, the ability to control devices remotely has become an essential aspect of modern living. Home automation and IoT (Internet of Things) have gained immense popularity, allowing users to control various appliances using smartphones or tablets. One of the widely used platforms for DIY electronics projects is Arduino, a versatile microcontroller that can be programmed to interact with the physical world.

Bluetooth technology, on the other hand, enables short-range wireless communication between electronic devices. By combining Arduino and a Bluetooth module, you can create a seamless connection between your smartphone and the physical world. In this project, we will explore how to use Arduino and a Bluetooth module to control an LED (Light Emitting Diode) through a custom Android app.

Hardware Requirements

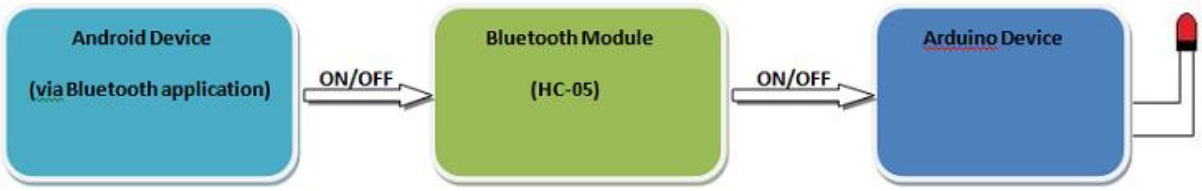
1. Arduino UNO board
2. USB cable for connecter Arduino UNO
3. Bluetooth Module HC-05
4. Jumper wires male to female
5. LED
6. AC 220v/120v home appliances or 9v Hi-Walt Batter

Software requirements

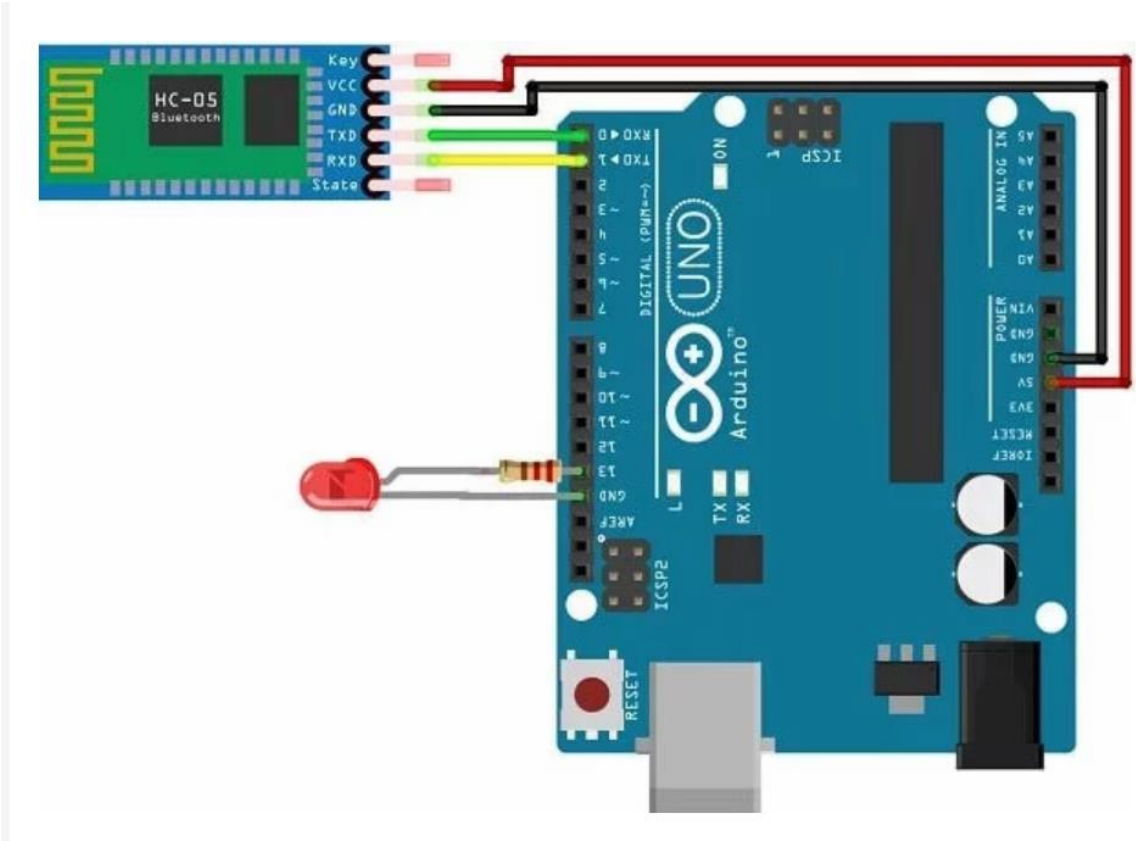
1. Arduino software
2. Android Studio

The Working principle of Arduino-Bluetooth Module

In this project, there are three main components used; an Android Smartphone, Bluetooth transceiver, and an Arduino.



The Android app is built to send serial data to the Bluetooth Module HC-05 by pressing ON button. As Bluetooth Module HC-05 works on serial communication. It receives the data from the app and sends it through TX pin of Bluetooth module to RX pin of Arduino. The uploaded code inside Arduino checks the data received. If the receive data is 1, the LED turns ON, and if the received data is 0 the LED turns OFF.

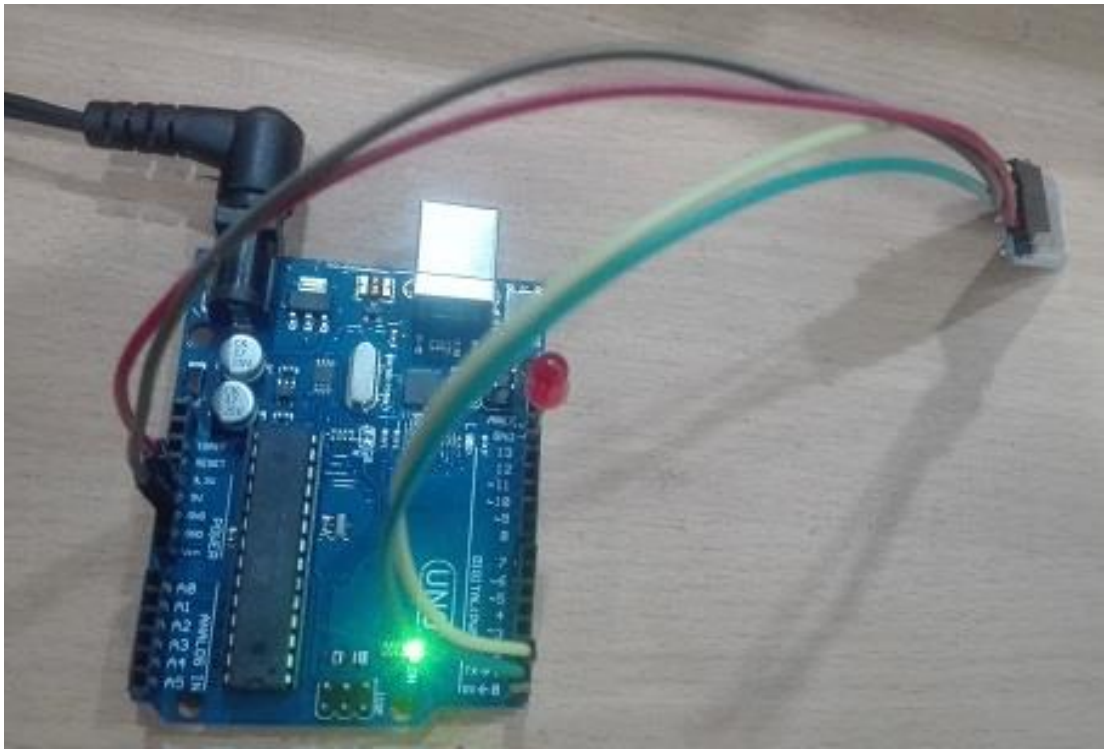


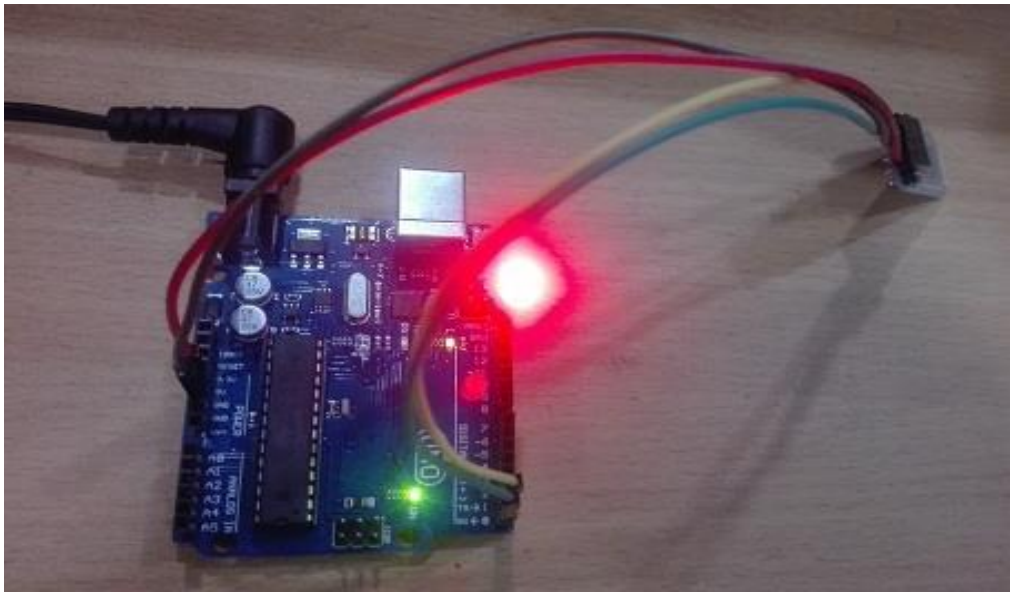
LED Pin Arduino UNO

Pin 1 ----------> GND

Pin 2 ----------> Pin 13

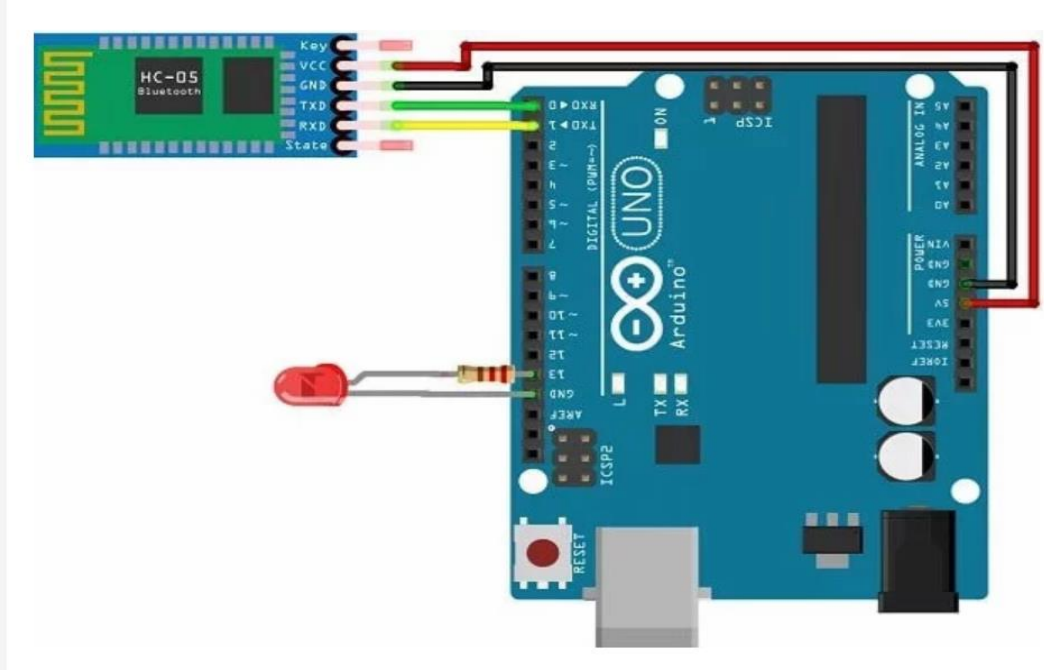
Write a program for Arduino UNO board, if received data is equal to 1, LED turns on and if data is equal to 0, LED turns OFF.





Components:

1. **Arduino UNO Board:**

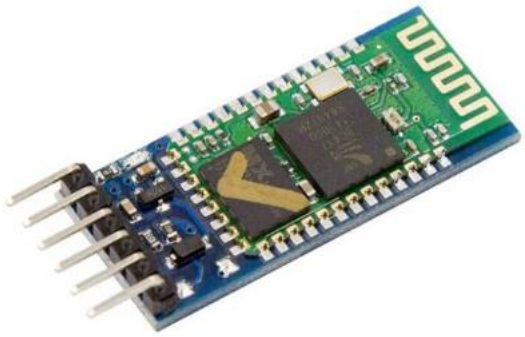


Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator (CSTCE16M0V53-R0), a USB connection, a power jack, an ICSP header and a reset button.

2. **USB cable for connecter Arduino UNO**

The Arduino Uno board can be connected to a computer or a power source using a standard USB cable. The type of USB cable required for connecting an Arduino Uno is a USB A to USB B cable.

3. **Bluetooth Module HC-05**

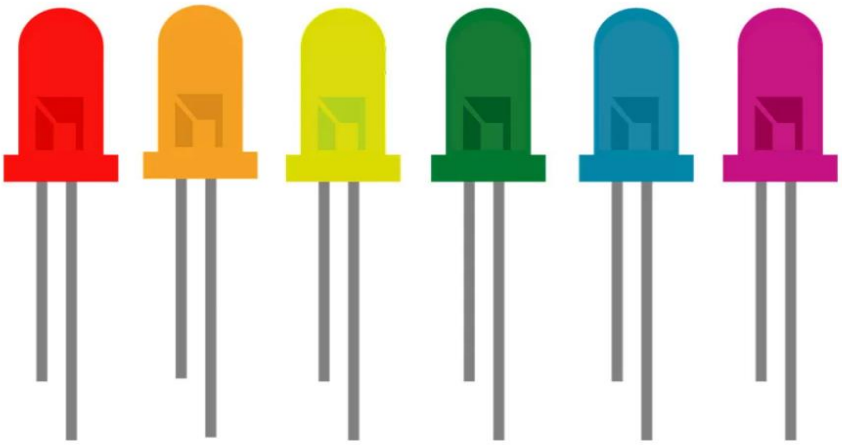


HC-05 Bluetooth Module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Its communication is via serial communication which makes an easy way to interface with controller or PC.

4. Jumper wires male to female

Male-to-female jumper wires are essential components in electronics prototyping and circuit building. They consist of a male connector on one end and a female connector on the other end. These connectors are designed to easily plug into and out of various electronic components, such as microcontrollers, sensors, breadboards, and modules.

5. LED



A Light Emitting Diode, or LED, is a semiconductor device that emits light when an electric current passes through it. LEDs are widely used in various applications due to their energy efficiency, long lifespan, and versatility. LEDs come in different shapes, sizes, and colors, making them suitable for a wide range of electronic projects and lighting applications.

Write a program for Arduino UNO board, if received data is equal to 1, LED turns on and if data is equal to 0, LED turns OFF.

```
char data = 0;
void setup()
{
    Serial.begin(9600);
    pinMode(13, OUTPUT); //Sets digital pin 13 as output pin
}
void loop()
{
   if(Serial.available() > 0)
   {
 data = Serial.read();
   Serial.print(data);
      if(data == '1')
         digitalWrite(13, HIGH);
      else if(data == '0')
         digitalWrite(13, LOW);
   }
}
```