

Experiment 7 : Connect Arduino board with Bluetooth Module and control LED using Bluetooth Terminal

Aim: The main aim of this experiment is to Connect Arduino board with Bluetooth Module and control LED using Bluetooth Terminal

1. COMPONENTS REQUIRED

- a) Arduino UNO
- b) Breadboard
- c) Bluetooth
- d) Jumper wires

a. ARDUINO UNO:

Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

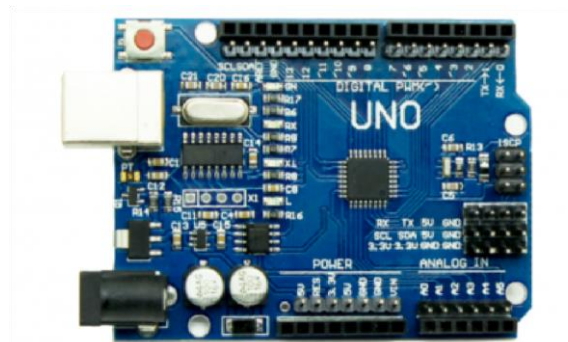


Figure 1.0 - Arduino UNO

b. BREADBOARD:

Breadboards are one of the most fundamental pieces when learning how to build circuits. Breadboards are commonly utilized while prototyping temporary circuits. It is useful to designers because it allows components to be removed and replaced easily.

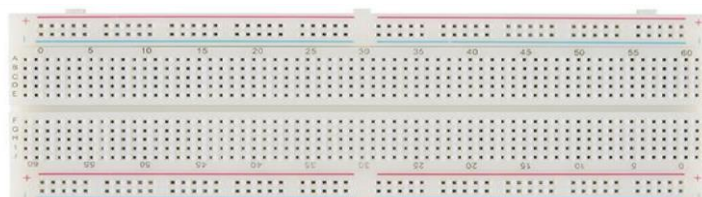


Figure 1.1 – Breadboard

2.SOFTWARE

Software is a generic term to refer to the scripts and programs that run on a microprocessor or microcontroller and execute specific tasks.

2.1 GET START WITH ARDUINO IDE

Follow the steps to install Arduino IDE:

Step 1: Browse for the URL - ' <https://www.arduino.cc/en/software> '

Step 2: In DOWNLOAD OPTIONS, choose Windows/Linux/Mac OS accordingly.

Step 3: Select - JUST DOWNLOAD. The download will start!

Step 4: Run the downloaded setup file.

3. PROGRAM

//LED Control using Bluetooth

```
#include <SoftwareSerial.h>
```

```
#define LED_pin 13
```

```
#define RGB_R 5 // Red LED pin
```

```
#define RGB_G 6 // Green LED pin
```

```
#define RGB_B 7 // Blue LED pin
```

```
SoftwareSerial bluetooth(2, 3); // RX, TX
```

```
void setup() {
```

```
    Serial.begin(9600); // Initialize the serial monitor
```

```
    bluetooth.begin(9600); // Initialize the Bluetooth communication
```

```
    pinMode(LED_pin, OUTPUT);
```

```
    pinMode(RGB_R, OUTPUT);
```

```
    pinMode(RGB_G, OUTPUT);
```

```

pinMode(RGB_B, OUTPUT);
}

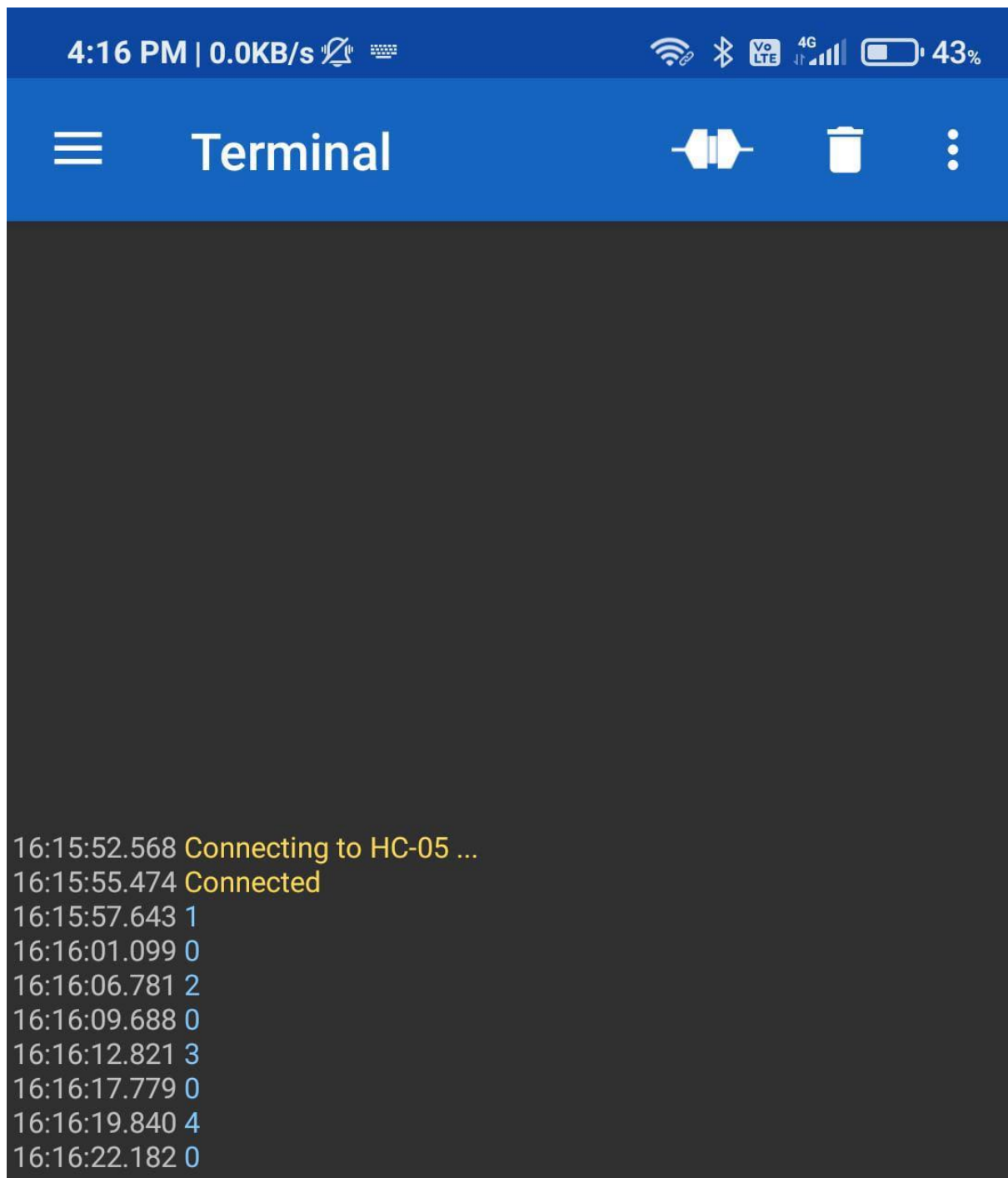
void loop() {
    // Check if data is available from Bluetooth module
    if (bluetooth.available()) {
        char receivedChar = bluetooth.read(); // Read the character received via Bluetooth
        Serial.print("Received: ");
        Serial.println(receivedChar);

        // Control LED based on received command
        if (receivedChar == '1') {
            digitalWrite(LED_pin, HIGH);
            Serial.println("LED_ON");
        }
        else if (receivedChar == '0') {
            digitalWrite(LED_pin, LOW);
            digitalWrite(RGB_R, LOW);
            digitalWrite(RGB_G, LOW);
            digitalWrite(RGB_B, LOW);
            Serial.println("LED_OFF");
        }
        else if (receivedChar == '2') {
            digitalWrite(RGB_R, HIGH);
            digitalWrite(RGB_G, LOW);
            digitalWrite(RGB_B, LOW);
            Serial.println("RGB_LED_ON (Red)");
        }
        else if (receivedChar == '3') {
            digitalWrite(RGB_R, LOW);
            digitalWrite(RGB_G, HIGH);

```

```
    digitalWrite(RGB_B, LOW);  
    Serial.println("RGB_LED_ON (Green)");  
}  
else if (receivedChar == '4') {  
    digitalWrite(RGB_R, LOW);  
    digitalWrite(RGB_G, LOW);  
    digitalWrite(RGB_B, HIGH);  
    Serial.println("RGB_LED_ON (Blue)");  
}  
}  
}
```

Output:



4. Results

Connect Arduino board with Bluetooth Module and control LED using Bluetooth using the microcontroller unit is successfully implemented.