แนวทางการใช้งานอินเทอร์เน็ตของสรรพสิ่งในระบบการผลิต
IoT Approaches to Manufacturing System

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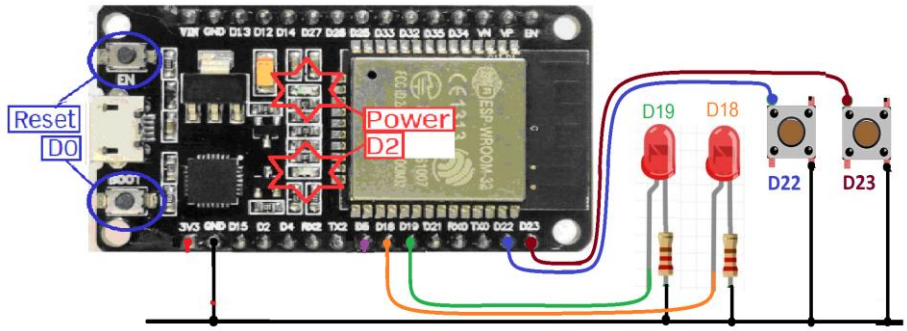
4/4. คำถามท้ายบทเพื่อทดสอบความเข้าใจ

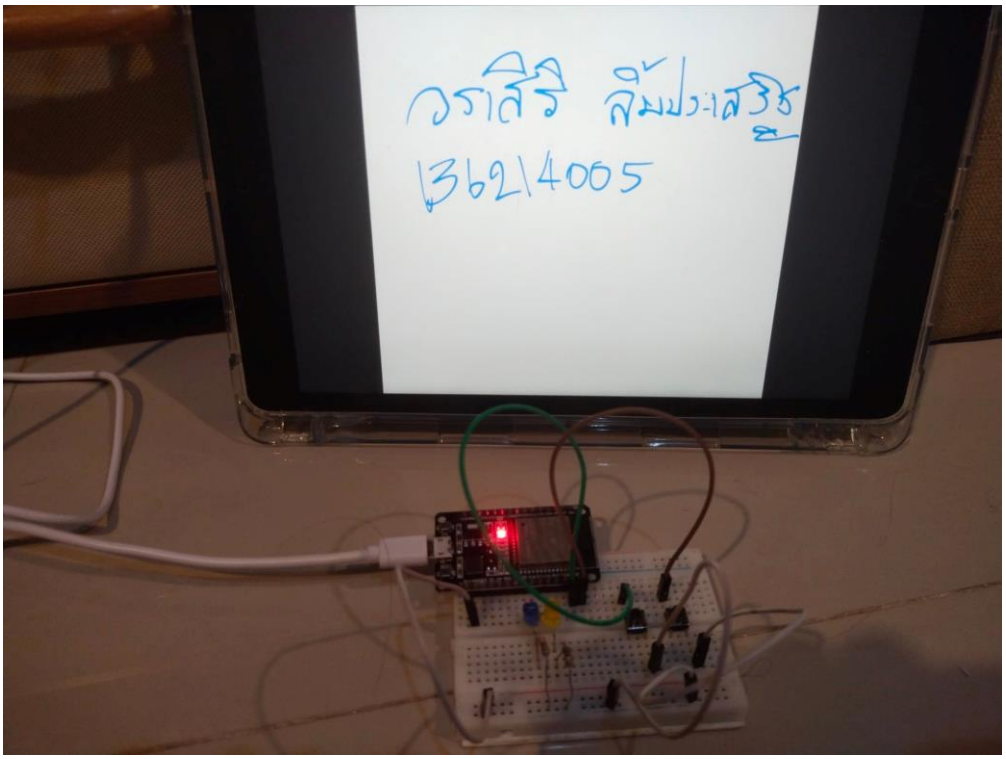
Quiz_101 – กดติด กดดับ 2 ชุด

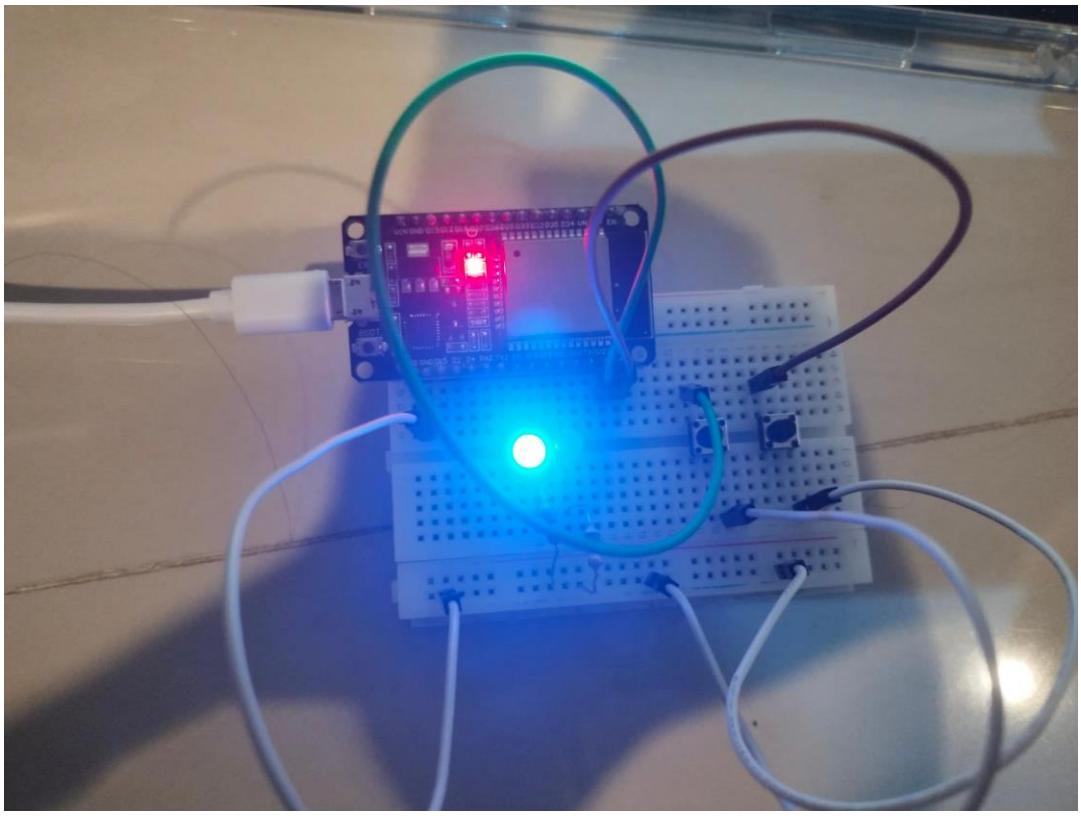
- หากต้องการให้ใช้ 1 สวิตซ์ ควบคุม 1 LED แบบกดติด-กดดับ จำนวน 2 วงจรจะต่อวงจรและเขียนโปรแกรมอย่างไร {SW-D22 -- LED-D19, SW-D23 -- LED-D18}

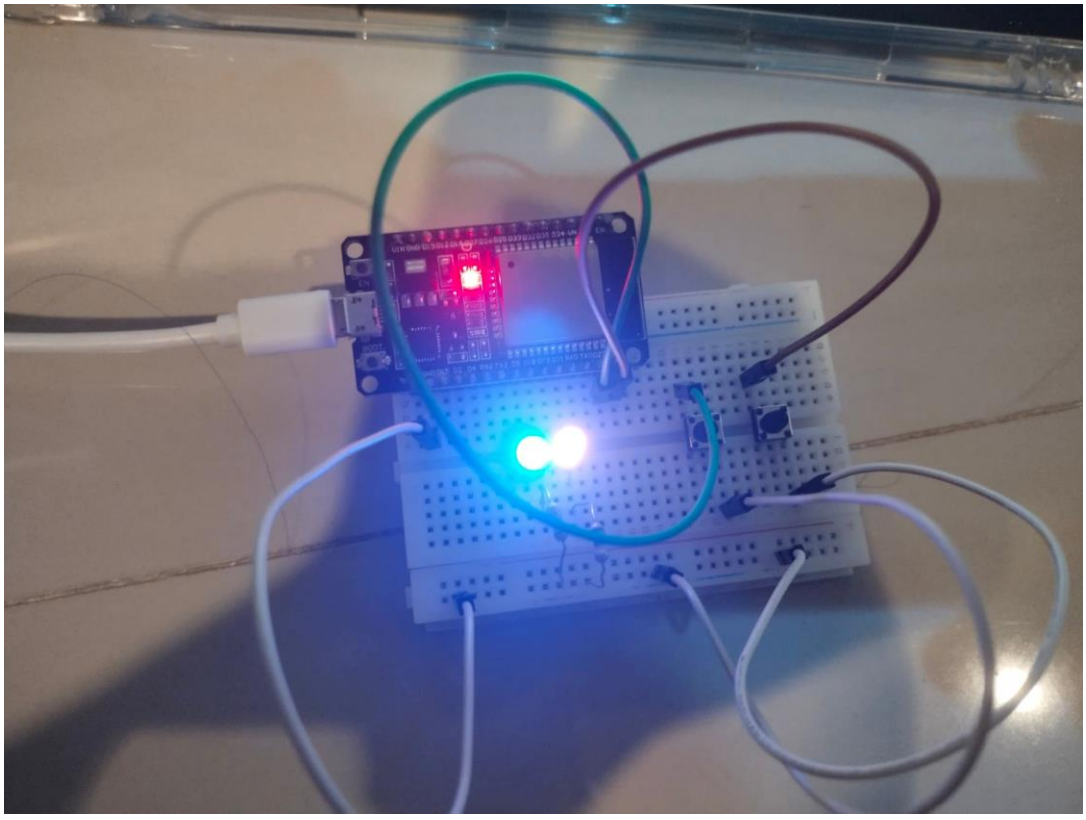



```
#define pushButton1 22
#define pushButton2 23
#define LEDPin1 18
#define LEDPin2 19

int buttonState1 = 0;
int buttonState2 = 0;

void setup() {
  Serial.begin(115200);
  pinMode(pushButton1, INPUT_PULLUP);
  pinMode(pushButton2, INPUT_PULLUP);
  pinMode(LEDPin1, OUTPUT);
  pinMode(LEDPin2, OUTPUT);
}
void loop() {
  if (digitalRead(pushButton1) == LOW) {
    delay(20);
    buttonState1 = 1 - buttonState1;
    digitalWrite(LEDPin1, buttonState1);
```

```
    while (digitalRead(pushButton1) == LOW);
    delay(20);
  }

  if (digitalRead(pushButton2) == LOW) {
    delay(20);
    buttonState2 = 1 - buttonState2;
    digitalWrite(LEDPin2, buttonState2);
    while (digitalRead(pushButton2) == LOW);
    delay(20);
  }
}
```



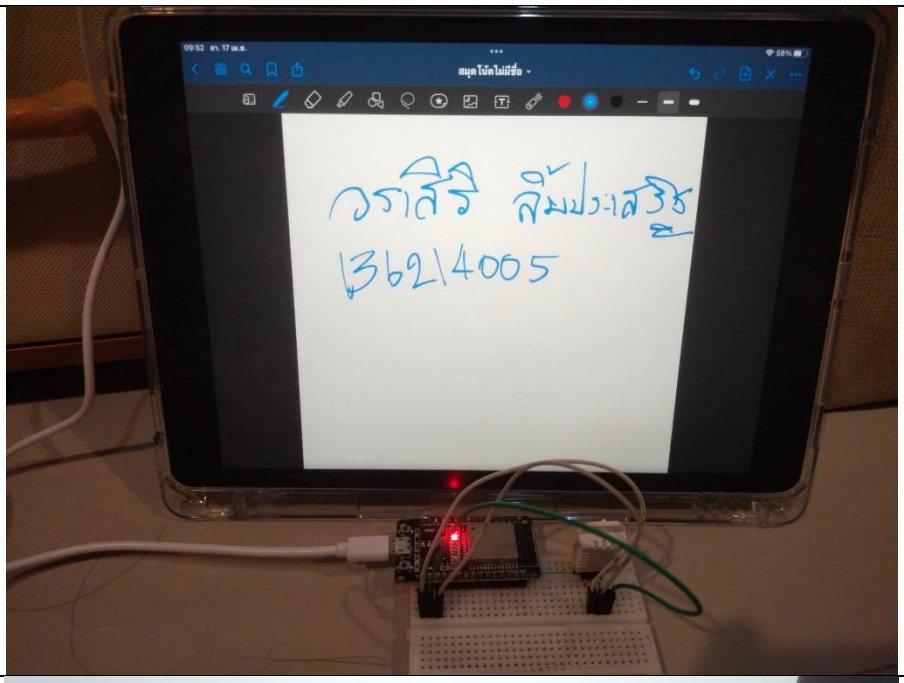


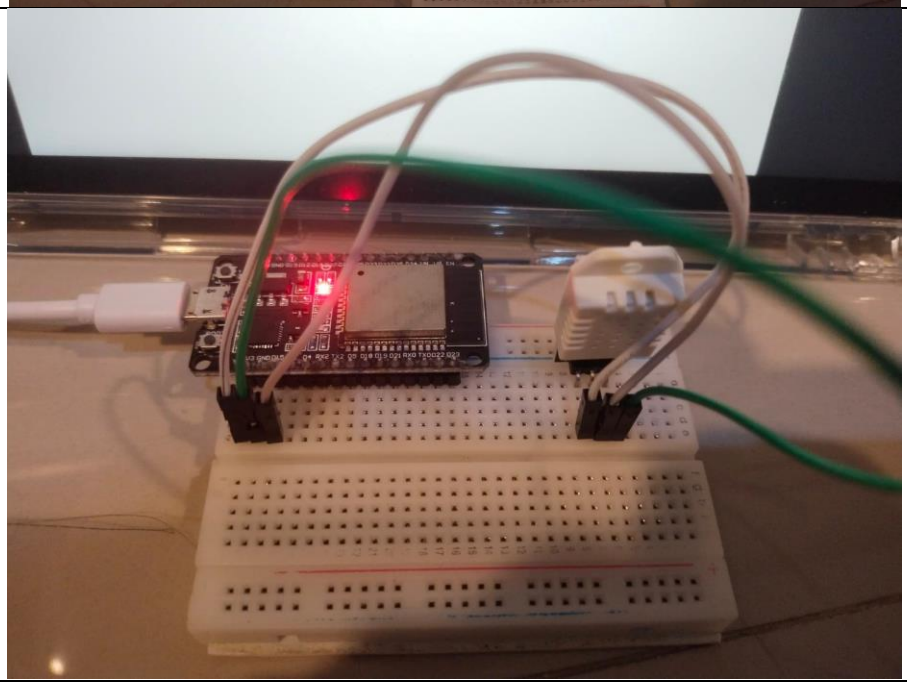


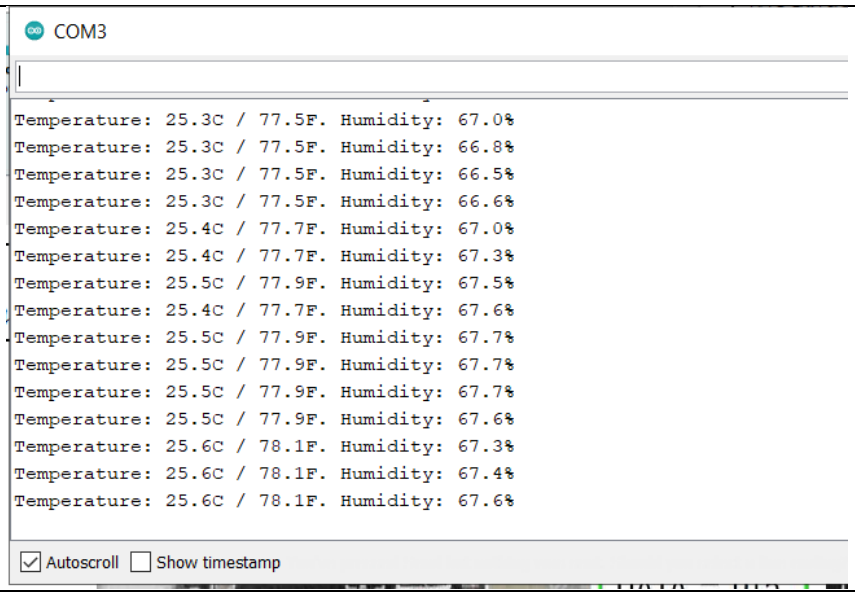
Quiz_102 – ปรับการแสดงผลที่ Serial Monitor เป็นดังนี้

```
Temperature: 23.0C / 74.7F. Humidity: 24.9%
Temperature: 23.0C / 74.7F. Humidity: 24.9%
Temperature: 23.0C / 74.7F. Humidity: 24.9%
```

```
#define DHT22_Pin 15
#include "DHTesp.h"
DHTesp dht;
void setup() {
  Serial.begin(115200);
  Serial.println();
  dht.setup(DHT22_Pin, DHTesp::DHT22); // Connect DHT sensor to GPIO 15
}
void loop() {
  delay(dht.getMinimumSamplingPeriod());
  float humidity = dht.getHumidity();
  float temperature = dht.getTemperature();
  Serial.print("Temperature: ");
  Serial.print(temperature, 1);
  Serial.print("C / ");
  Serial.print(dht.toFahrenheit(temperature), 1);
  Serial.print("F. Humidity: ");
  Serial.print(humidity, 1);
  Serial.print("% \n");
  delay(2000);
}
```

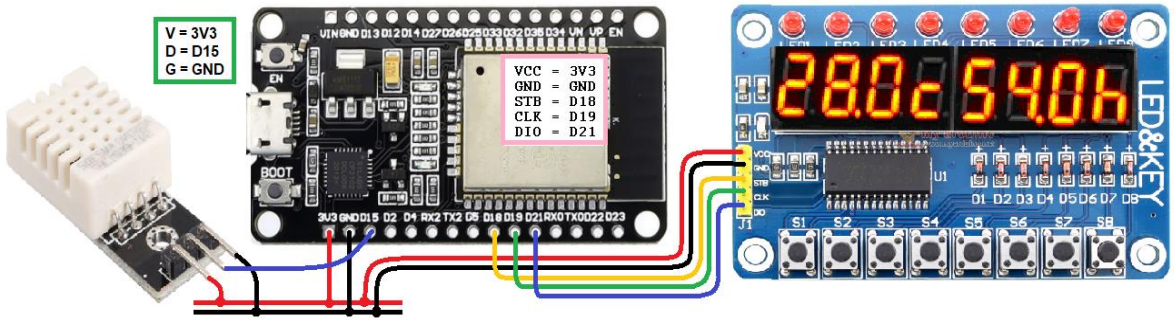

วราสิริ ลิ้มประเสริฐ
13621405




COM3
Temperature: 25.3C / 77.5F. Humidity: 67.0%
Temperature: 25.3C / 77.5F. Humidity: 66.8%
Temperature: 25.3C / 77.5F. Humidity: 66.5%
Temperature: 25.3C / 77.5F. Humidity: 66.6%
Temperature: 25.4C / 77.7F. Humidity: 67.0%
Temperature: 25.4C / 77.7F. Humidity: 67.3%
Temperature: 25.5C / 77.9F. Humidity: 67.5%
Temperature: 25.4C / 77.7F. Humidity: 67.6%
Temperature: 25.5C / 77.9F. Humidity: 67.7%
Temperature: 25.5C / 77.9F. Humidity: 67.7%
Temperature: 25.5C / 77.9F. Humidity: 67.7%
Temperature: 25.5C / 77.9F. Humidity: 67.6%
Temperature: 25.6C / 78.1F. Humidity: 67.3%
Temperature: 25.6C / 78.1F. Humidity: 67.4%
Temperature: 25.6C / 78.1F. Humidity: 67.6%
Autoscroll
Show timestamp

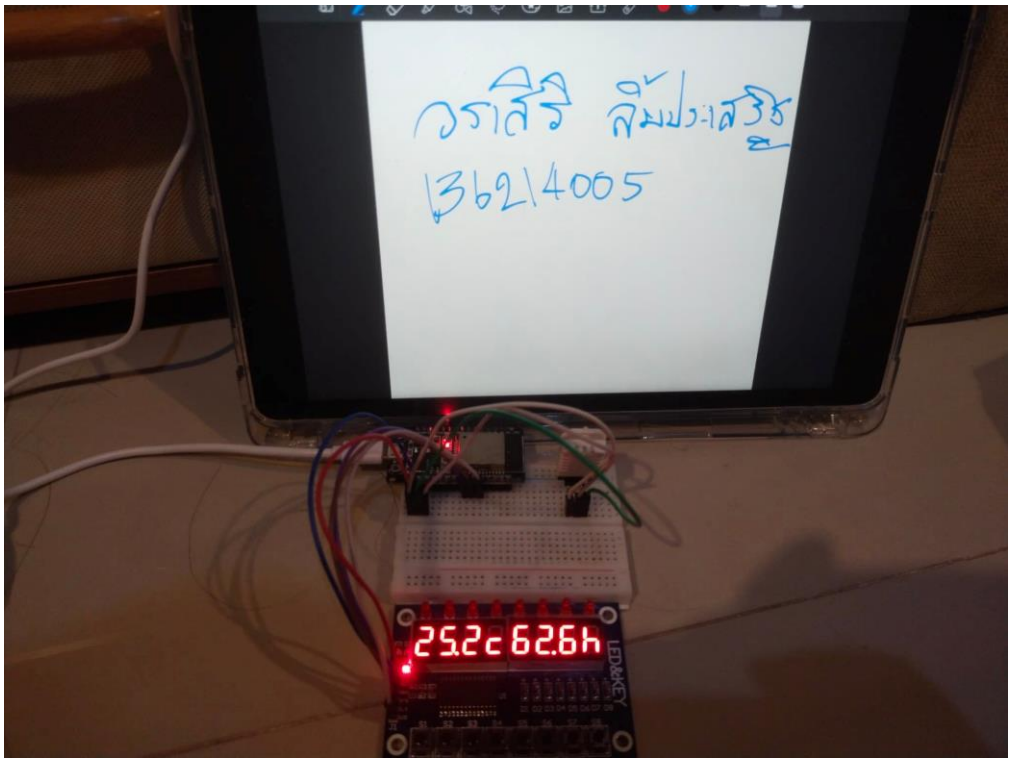
Quiz_103 – Read Sensor and Show

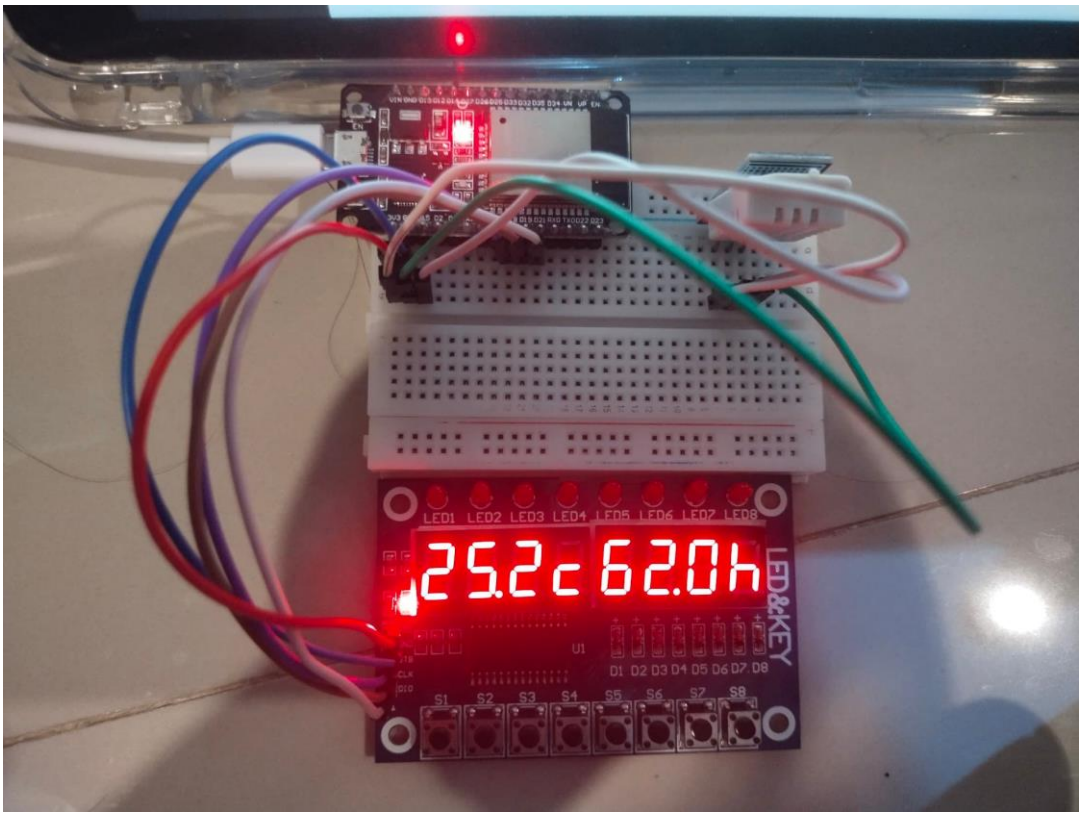
- ต่อวงจรเพิ่มเติม ทดสอบการทำงานด้วยโปรแกรมต่อไปนี้ และปรับแก้ให้ถูกต้อง




```
#include <TM1638plus.h>
#include "DHTesp.h"
DHTesp dht;

#define DHT22_Pin 15
#define Brd_STB 18 // strobe = GPIO connected to strobe line of module
#define Brd_CLK 19 // clock = GPIO connected to clock line of module
#define Brd_DIO 21 // data = GPIO connected to data line of module
bool high_freq = true; //default false,, If using a high freq CPU > ~100 MHZ set to true.
TM1638plus tm(Brd_STB, Brd_CLK , Brd_DIO, high_freq);

void setup() {
  Serial.begin(115200);
  tm.displayBegin();
  dht.setup(DHT22_Pin, DHTesp::DHT22); // Connect DHT sensor to GPIO 15
}

void loop() {

  float humidity = dht.getHumidity();
  float temperature = dht.getTemperature();

  Serial.print("Temperature: ");
  Serial.print(temperature); Serial.print(" *C\t");
  Serial.print("Humidity: ");
```

```
  Serial.print(humidity); Serial.print(" %\n");

  float Tempp_1 = temperature / 10;
  float Tempp_2 = (int)temperature % 10;
  int Tempp_3 = (int)(temperature * 10) % 10;
  int Humi_1 = humidity / 10;
  int Humi_2 = (int)humidity % 10;
  int Humi_3 = int(humidity * 10) % 10;

  tm.displayHex(0, Tempp_1);
  tm.displayASCIIwDot(1, Tempp_2 + '0'); // turn on dot
  tm.displayHex(2, Tempp_3);
  tm.display7Seg(3, B01011000); // Code=tgfedcba
  tm.displayHex(4, Humi_1);
  tm.displayASCIIwDot(5, Humi_2 + '0'); // turn on dot
  tm.displayHex(6, Humi_3);
  tm.display7Seg(7, B01110100); // Code=tgfedcba
  delay(2000);
}
```




LED1 LED2 LED3 LED4 LED5 LED6 LED7 LED8
25.2c 62.0h
LED&KEY
U1
D1 D2 D3 D4 D5 D6 D7 D8
S1 S2 S3 S4 S5 S6 S7 S8