แนวทางการใช้งานอินเทอร์เน็ตของสรรพสิ่งในระบบการผลิต

IoT Approaches to Manufacturing System

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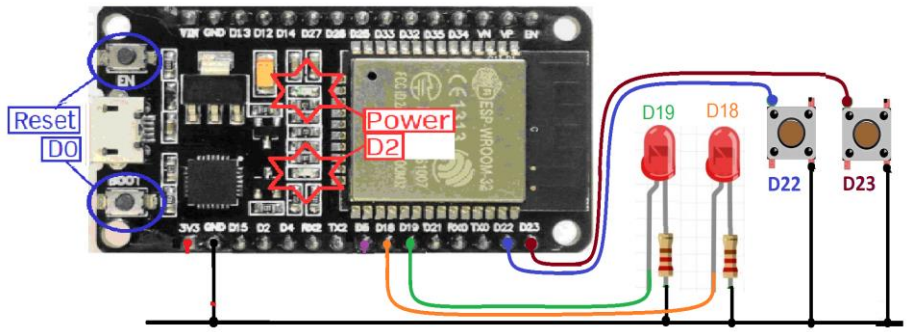
4/4. คำถามท้ายบทเพื่อทดสอบความเข้าใจ

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}



Q101 | Arduino 1.8.19

File Edit Sketch Tools Help

Q101

```
//Quiz_101_กดติด กดดับ 2 ชุด
#define pushButton1 22
#define LEDPin1 19
#define pushButton2 23
#define LEDPin2 18
int buttonState1 = 0;
int buttonState2 = 0;

void setup() {
  Serial.begin(115200);
  pinMode(pushButton1, INPUT_PULLUP);
  pinMode(LEDPin1, OUTPUT);
  pinMode(pushButton2, INPUT_PULLUP);
  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);
    }

}
```

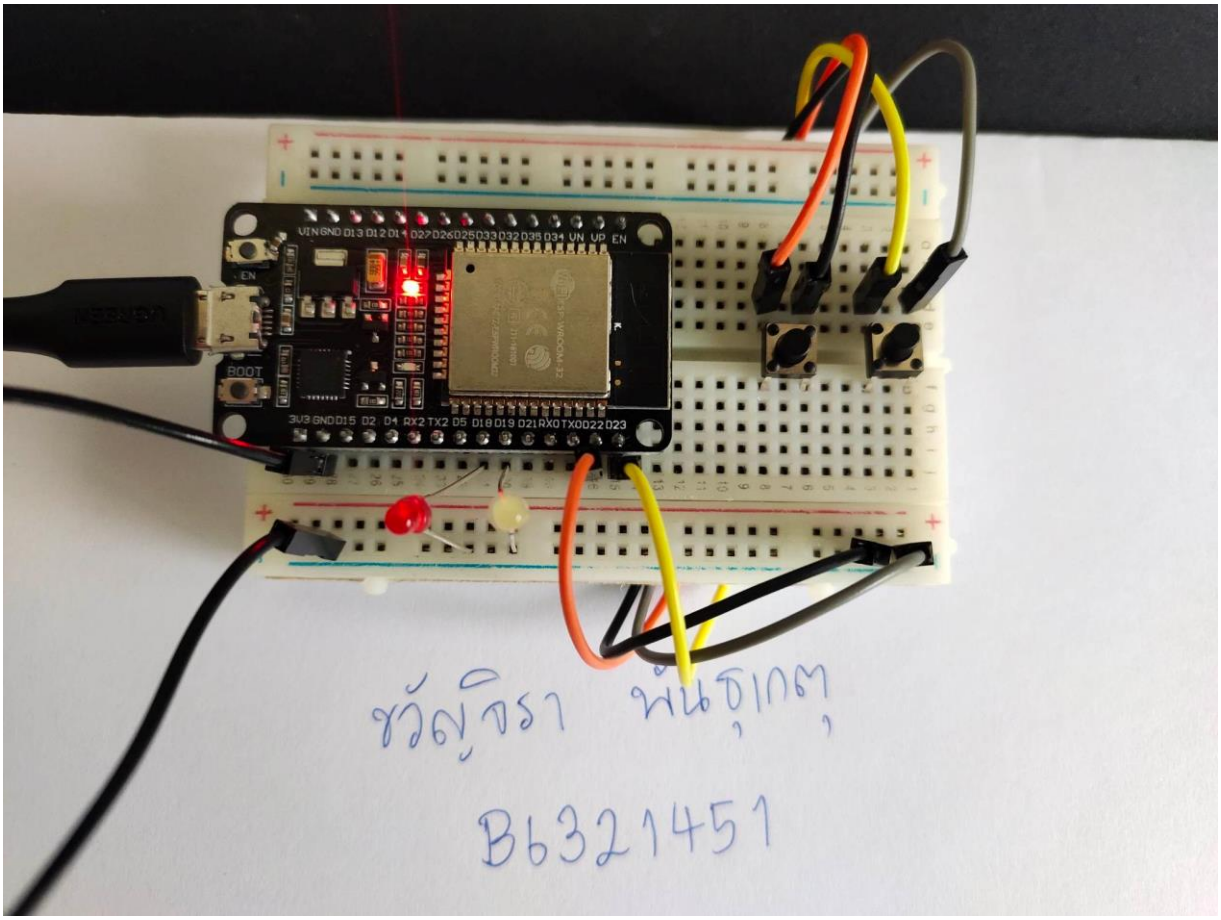
Done Saving.

```
Leaving...
Hard resetting via RTS pin...
```

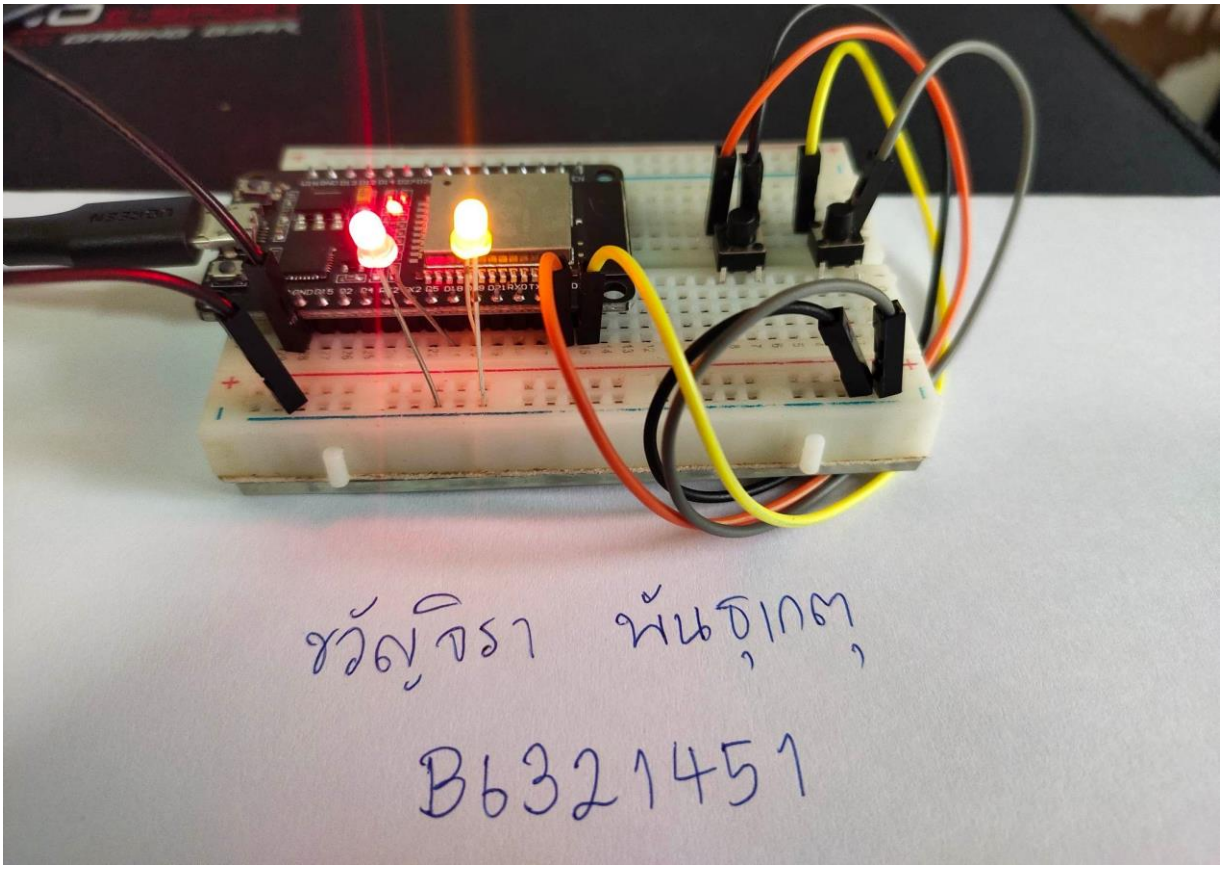
```
//Quiz_101_กดติด กดดับ 2 ชุด
#define pushButton1 22
#define LEDPin1 19
#define pushButton2 23
#define LEDPin2 18
int buttonState1 = 0;
int buttonState2 = 0;


void setup() {
  Serial.begin(115200);
  pinMode(pushButton1, INPUT_PULLUP);
  pinMode(LEDPin1, OUTPUT);
  pinMode(pushButton2, INPUT_PULLUP);
  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);
    }
}
```

รูปการต่อวงจร – 1



รูปการต่อวงจร – 2

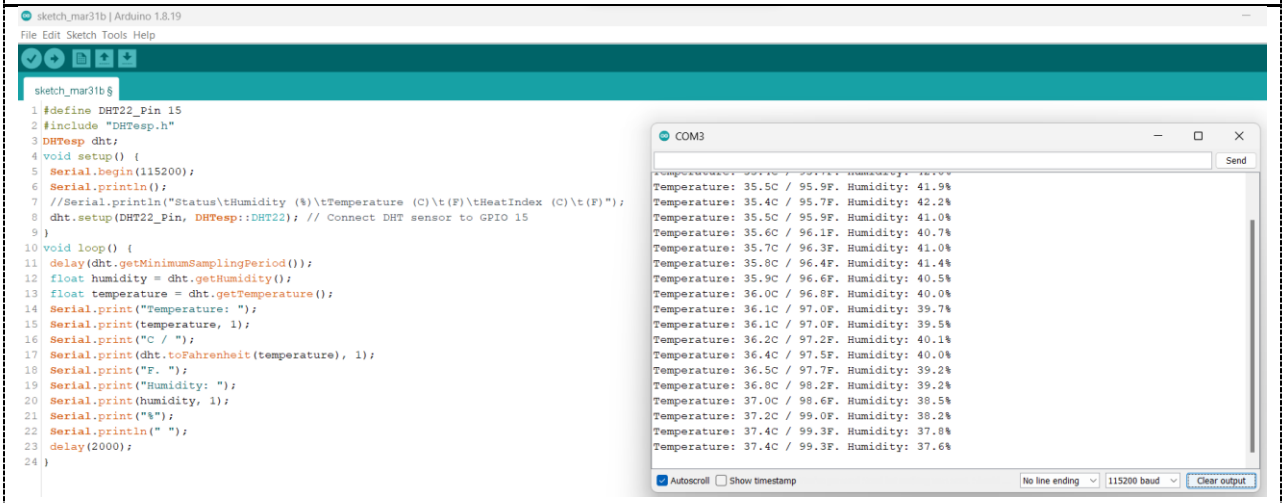


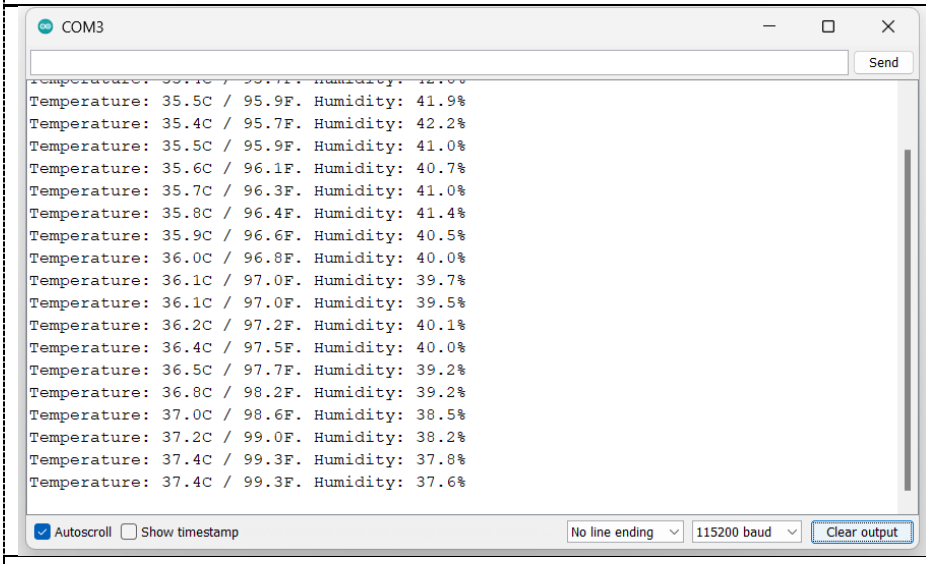
Video

https://www.youtube.com/watch?v=61rc4MltXqQ

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%

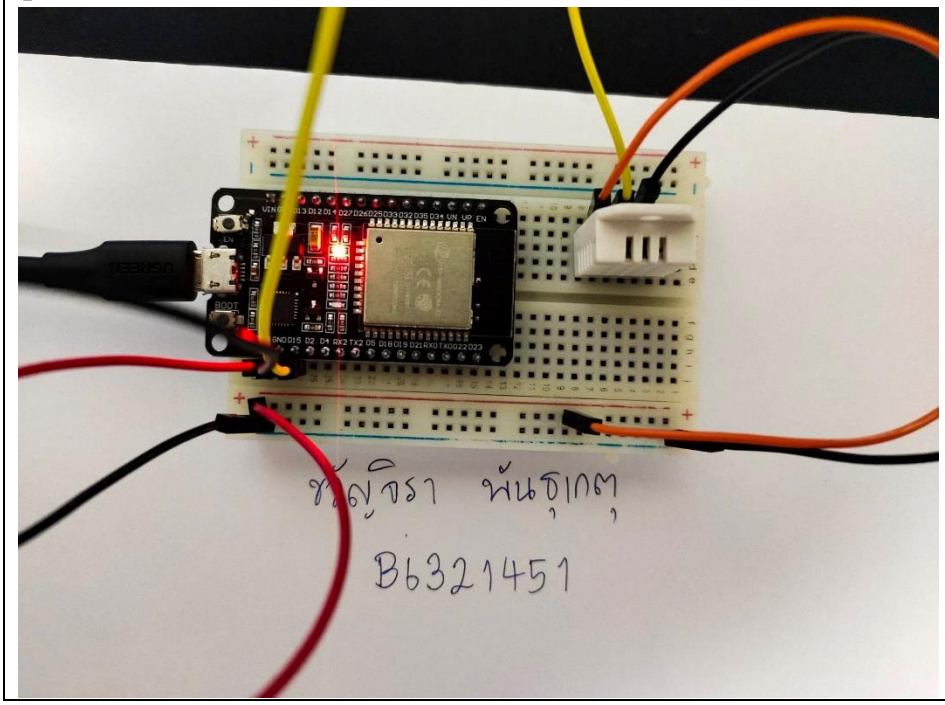




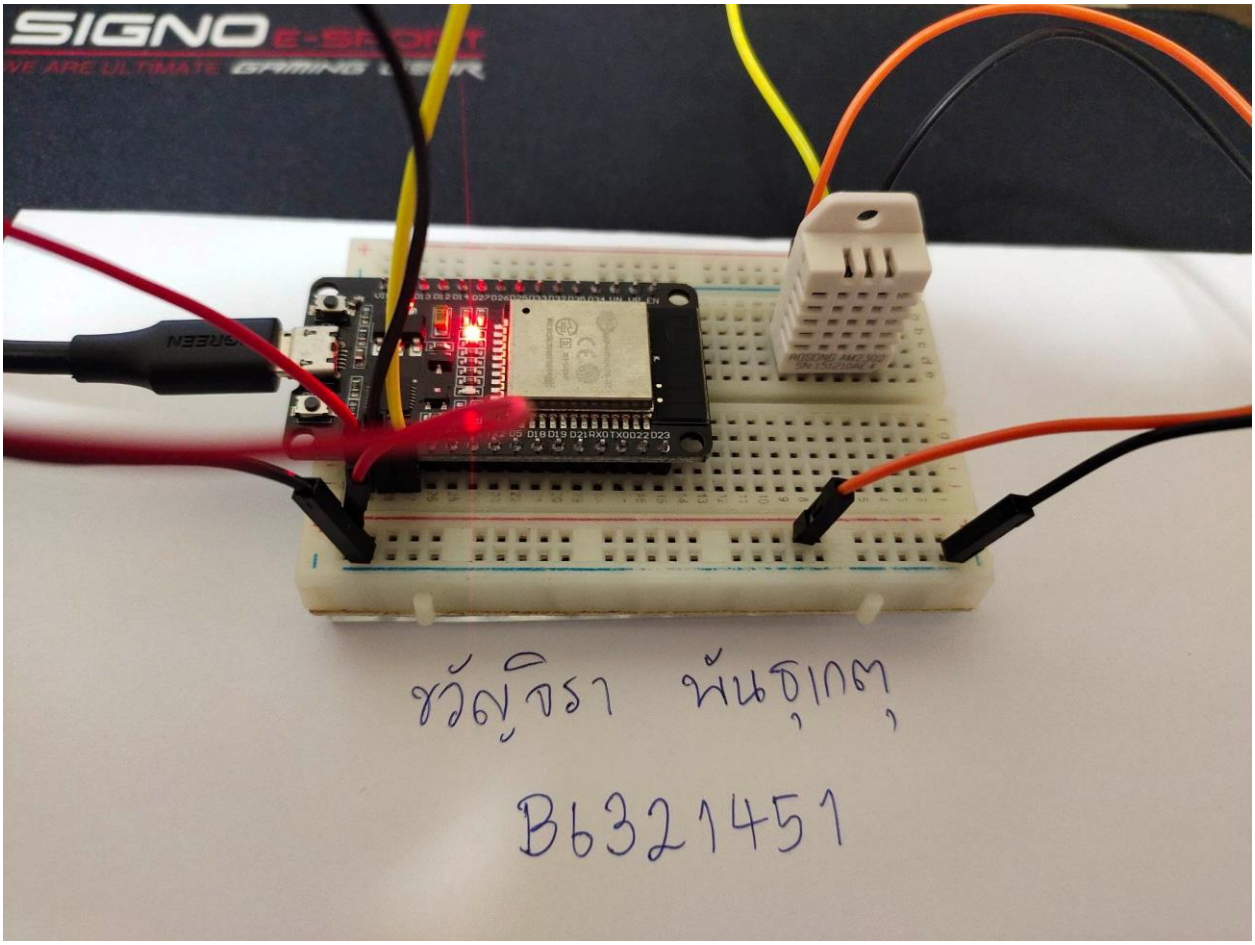

```
#define DHT22_Pin 15
#include "DHTesp.h"
DHTesp dht;
void setup() {
 Serial.begin(115200);
 Serial.println();
 //Serial.println("Status\tHumidity (%)\tTemperature (C)\t(F)\tHeatIndex (C)\t(F)");
```

```
 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. ");
 Serial.print("Humidity: ");
 Serial.print(humidity, 1);
 Serial.print("%");
 Serial.println(" ");
 delay(2000);
}
```

รูปการต่อวงจร – 1



รูปการต่อวงจร – 2

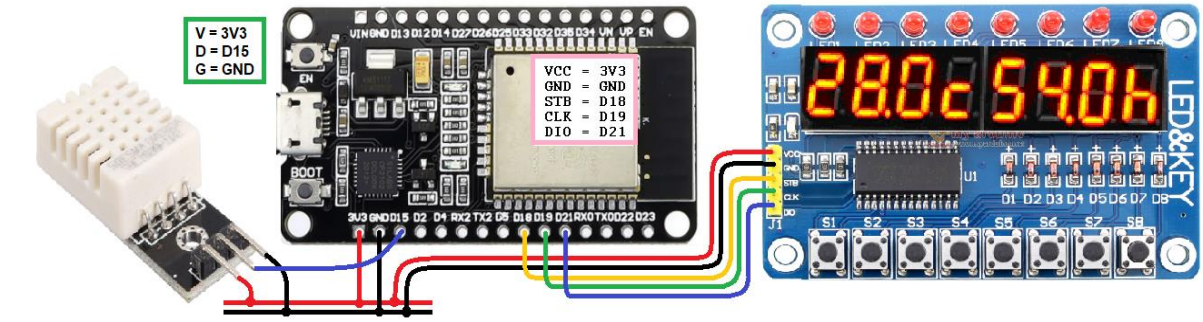


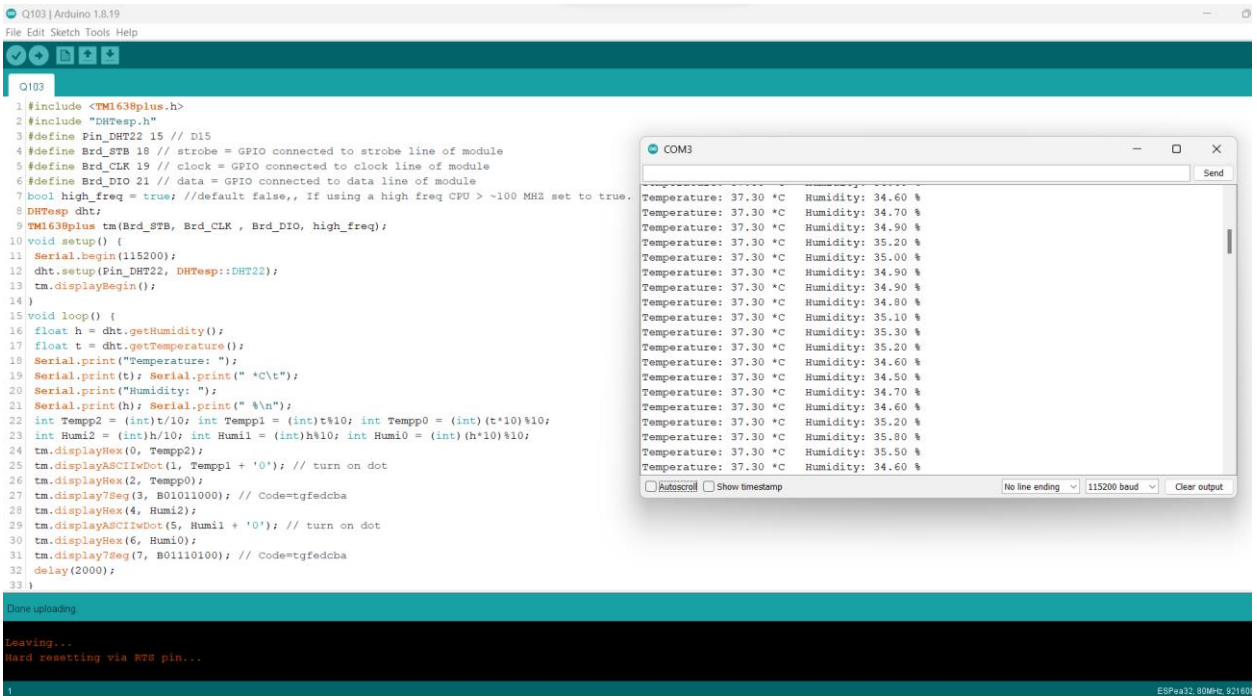
Video

https://www.youtube.com/shorts/7_qGwZy1J-U

Quiz_103 – Read Sensor and Show

- ต่อวงจรเพิ่มเติม ทดสอบการทำงานด้วยโปรแกรมต่อไปนี้ และปรับแก้ให้ถูกต้อง



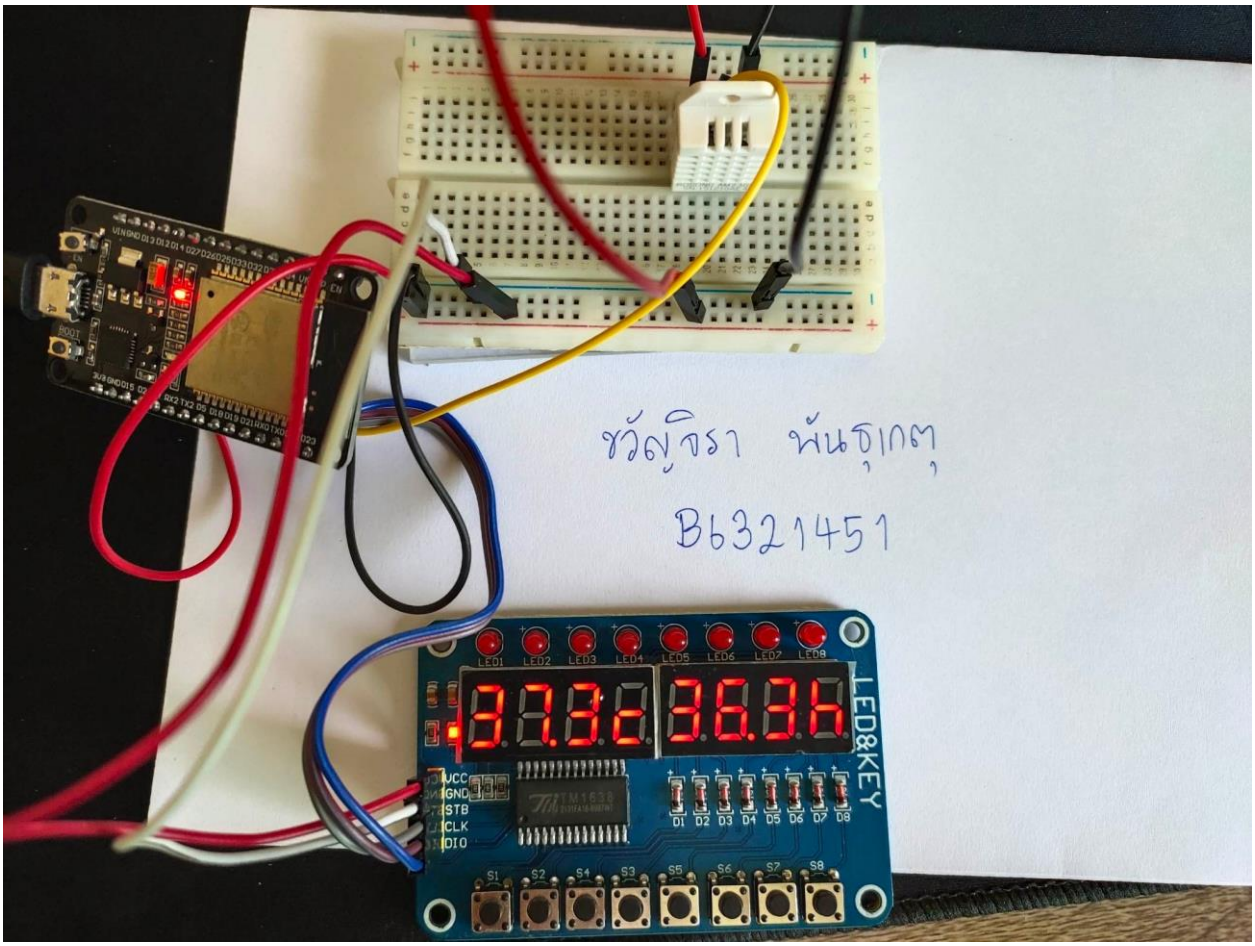



```
#include <TM1638plus.h>

#include "DHTesp.h"

#define Pin_DHT22 15 // D15

#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.

DHTesp dht;

TM1638plus tm(Brd_STB, Brd_CLK , Brd_DIO, high_freq);

void setup() {

 Serial.begin(115200);

 dht.setup(Pin_DHT22, DHTesp::DHT22);

 tm.displayBegin();

}

void loop() {

 float h = dht.getHumidity();

 float t = dht.getTemperature();

 Serial.print("Temperature: ");

 Serial.print(t); Serial.print(" *C\t");

 Serial.print("Humidity: ");

 Serial.print(h); Serial.print(" %\n");

 int Tempp2 = (int)t/10; int Tempp1 = (int)t%10; int Tempp0 = (int)(t*10)%10;

 int Humi2 = (int)h/10; int Humi1 = (int)h%10; int Humi0 = (int)(h*10)%10;

 tm.displayHex(0, Tempp2);

 tm.displayASCIIwDot(1, Tempp1 + '0'); // turn on dot

 tm.displayHex(2, Tempp0);

 tm.display7Seg(3, B01011000); // Code=tgfedcba

 tm.displayHex(4, Humi2);

 tm.displayASCIIwDot(5, Humi1 + '0'); // turn on dot

 tm.displayHex(6, Humi0);
```

```
 tm.display7Seg(7, B01110100); // Code=tgfedcba

 delay(2000);

}
```

รูปการต่อวงจร – 1



รูปการต่อวงจร – 2