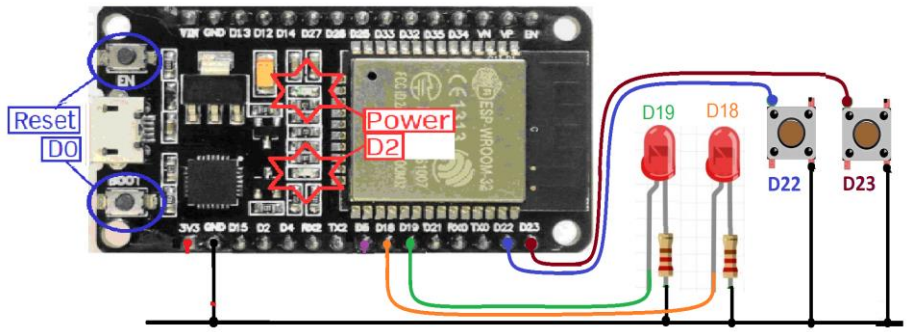
แนวทางการใช้งานอินเทอร์เน็ตของสรรพสิ่งในระบบการผลิต **IoT Approaches to Manufacturing System**	
ชื่อ-สกุล : นายปราชญา ธนพิบูลผล	**รหัสนักศึกษา : B6323059**

4/4. คำถามท้ายบทเพื่อทดสอบความเข้าใจ

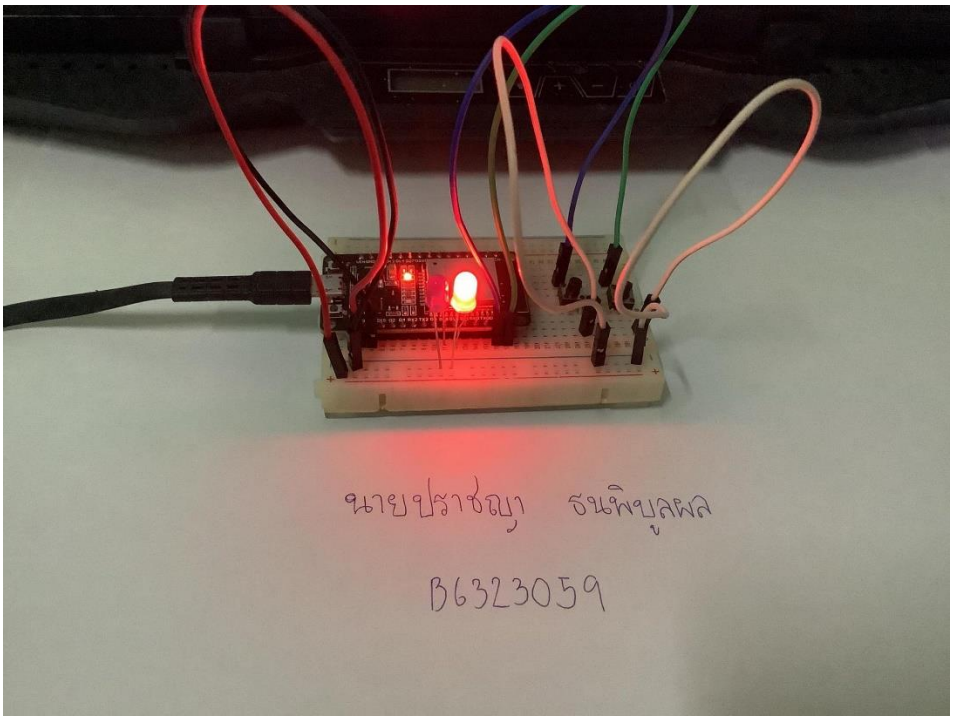
Quiz_101 – กดติด กดดับ 2 ชุด

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




```
#define pushButton1 22

#define LEDPin1 18

#define pushButton2 23

#define LEDPin2 19

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);
  }
}
```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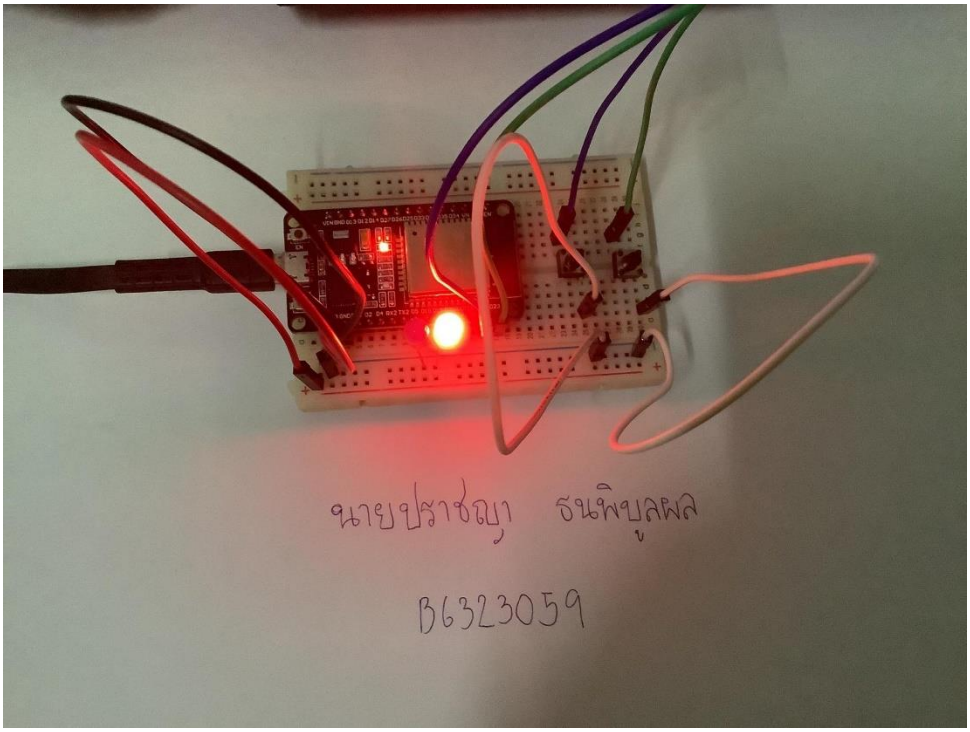
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Quiz_102 – ปรับการแสดงผลที่ Serial Monitor เป็นดังนี้

```
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();
  float tempF = (temperature * 9 / 5) + 32;
  Serial.print("Temperture: ");
  Serial.print(temperature, 1);
  Serial.print("C/");
  Serial.print(tempF, 1);
  Serial.print("F. Humidity: ");
  Serial.print(humidity);
  Serial.println("%");
  delay(2000);
}
```


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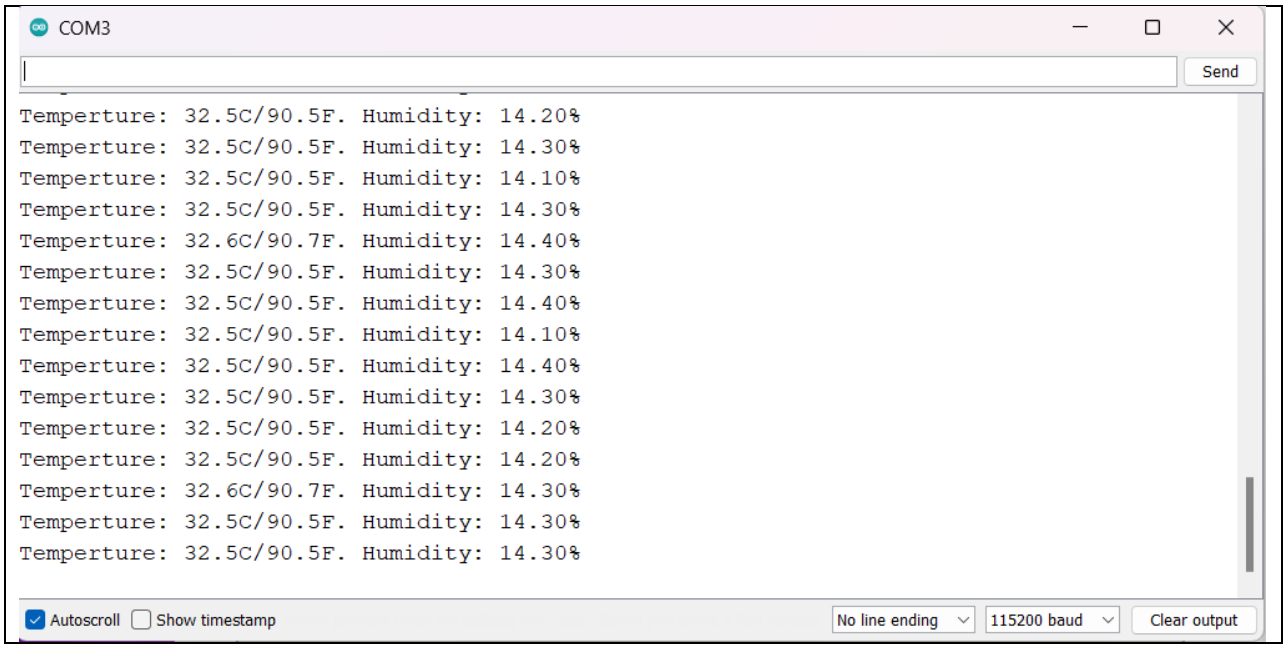
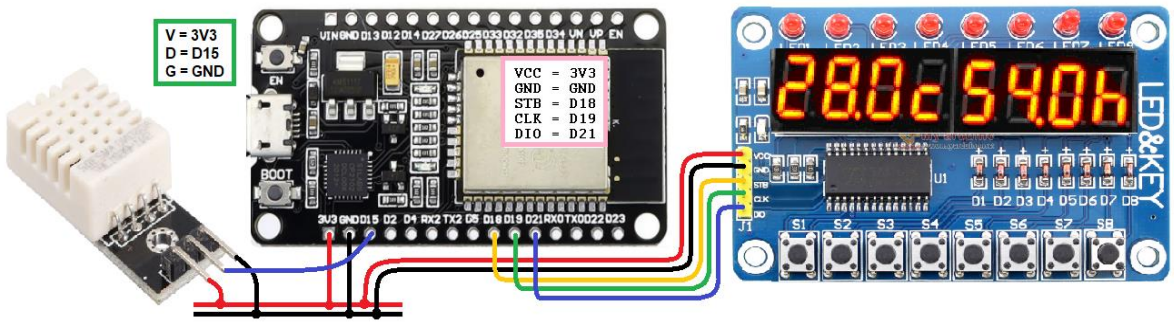

COM3
Send
Temperture: 32.5C/90.5F. Humidity: 14.20%
Temperture: 32.5C/90.5F. Humidity: 14.30%
Temperture: 32.5C/90.5F. Humidity: 14.10%
Temperture: 32.5C/90.5F. Humidity: 14.30%
Temperture: 32.6C/90.7F. Humidity: 14.40%
Temperture: 32.5C/90.5F. Humidity: 14.30%
Temperture: 32.5C/90.5F. Humidity: 14.40%
Temperture: 32.5C/90.5F. Humidity: 14.10%
Temperture: 32.5C/90.5F. Humidity: 14.40%
Temperture: 32.5C/90.5F. Humidity: 14.30%
Temperture: 32.5C/90.5F. Humidity: 14.20%
Temperture: 32.5C/90.5F. Humidity: 14.20%
Temperture: 32.6C/90.7F. Humidity: 14.30%
Temperture: 32.5C/90.5F. Humidity: 14.30%
Temperture: 32.5C/90.5F. Humidity: 14.30%
Autoscroll
Show timestamp
No line ending
115200 baud
Clear output

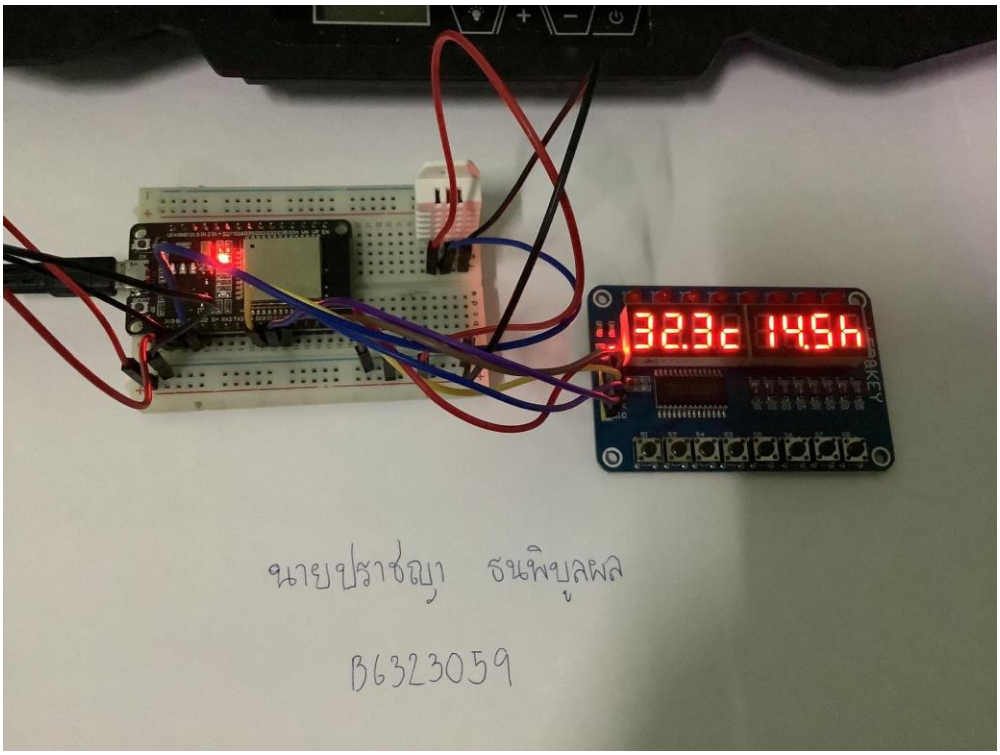
Quiz_103 – Read Sensor and Show

- 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);
}
```


32.3c 14.5h
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32.4c 14.6h
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