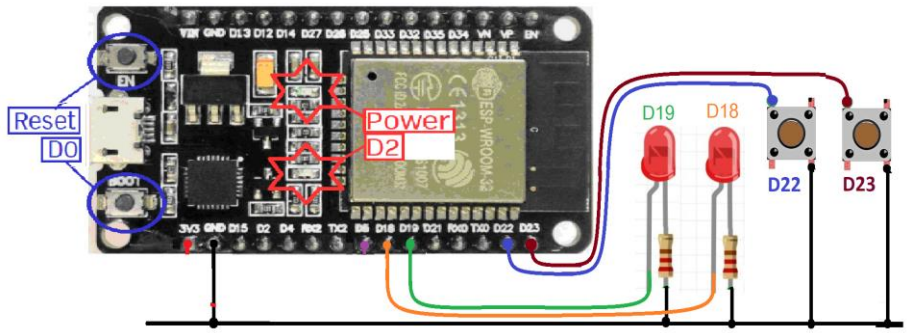
แนวทางการใช้งานอินเทอร์เน็ตของสรรพสิ่งในระบบการผลิต
IoT Approaches to Manufacturing System

ชื่อ-สกุล : นางสาวณัฐชยา ผ่องกุศล B6226718

4/4. คำถามท้ายบทเพื่อทดสอบความเข้าใจ

Quiz_101 – กดติด กดดับ 2 ชุด

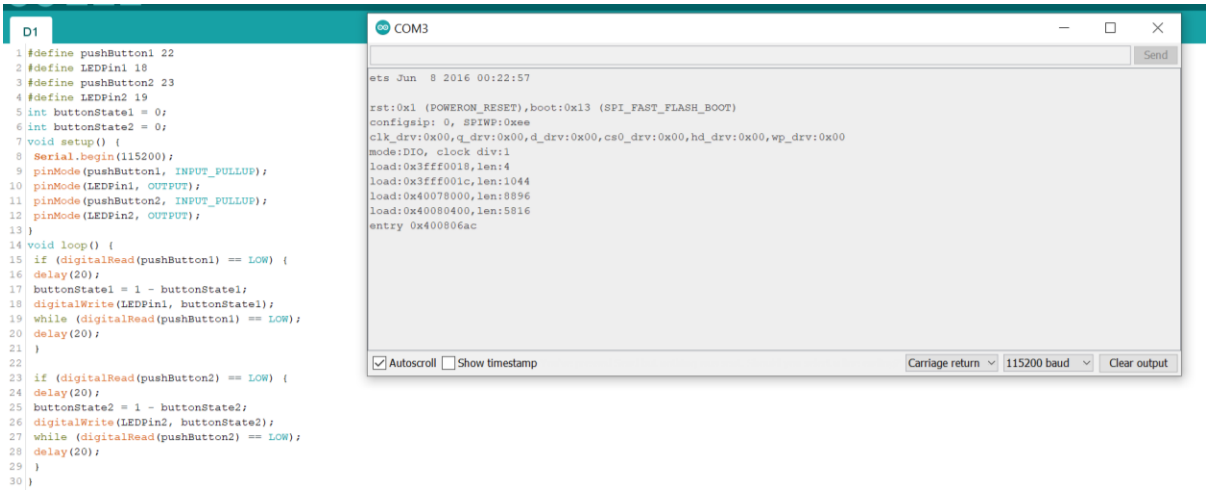
- หากต้องการให้ใช้ 1 สวิตซ์ ควบคุม 1 LED แบบกดติด-กดดับ จำนวน 2 วงจรจะต่อวงจรและเขียนโปรแกรมอย่างไร {SW-D22 -- LED-D19, SW-D23 -- LED-D18}

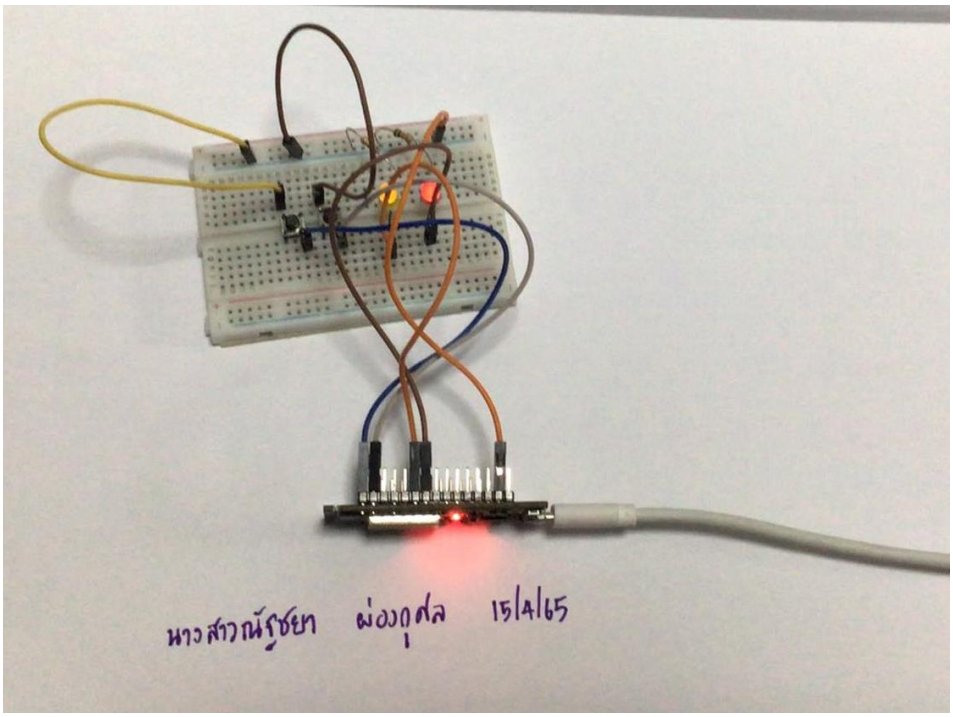



```
#define pushButton1 22
#define LEDPin1 18
#define pushButton2 23
#define LEDPin2 19
int buttonState1 = 0;
int buttonState2 = 0;
void setup() {
 Serial.begin(115200);
 pinMode(pushButton1, INPUT_PULLUP);
 pinMode(LEDPin1, OUTPUT);
 pinMode(pushButton2, INPUT_PULLUP);
 pinMode(LEDPin2, OUTPUT);
}
void 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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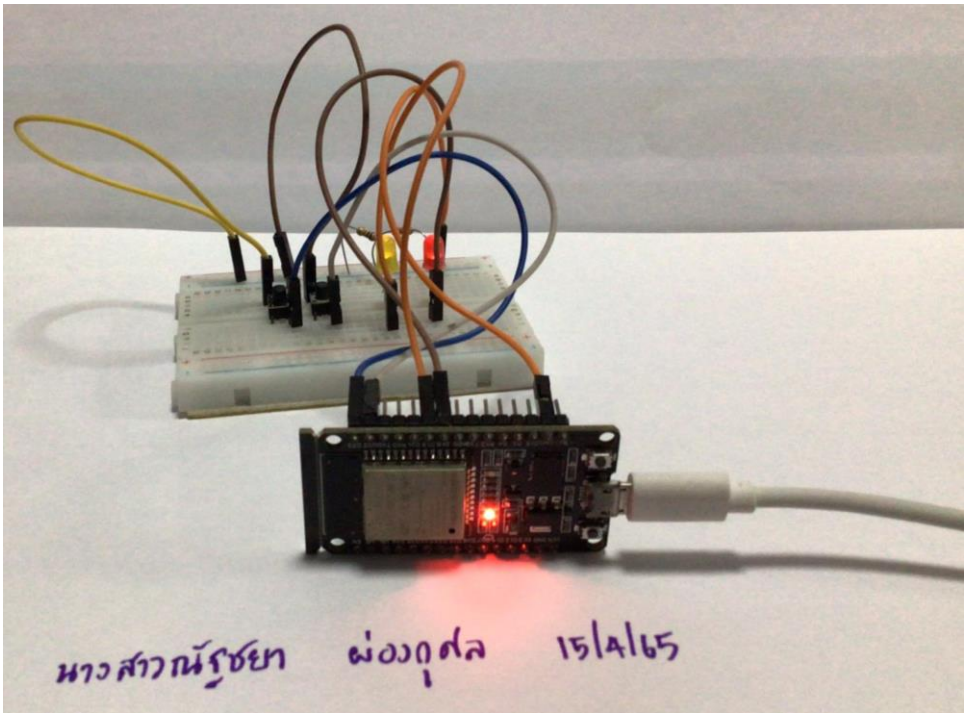
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Quiz_102 – ปรับการแสดงผลที่ Serial Monitor เป็นดังนี้

```
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);
}
```

D1

```
#define DHT22_Pin 15
#include "DHTesp.h"
DHTesp dht;
void setup() {
 Serial.begin(115200);
 Serial.println();
 dht.setup(DHT22_Pin, DHTesp::DHT22); // Connect DH
}
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);
}
```

COM3

```
rst:0x1 (POWERON_RESET),boot:0x13 (SPI_FAST_FLASH_BOOT)
configsip: 0, SPIWP:0xee
clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x00,wp_drv:0x00
mode:DIO, clock div:1
load:0x3fff0018,len:4
load:0x3fff001c,len:1044
load:0x40078000,len:8896
load:0x40080400,len:5816
entry 0x400806ac

Temperture: 32.5C/90.5F. Humidity: 99.90%
Temperture: 32.5C/90.5F. Humidity: 99.90%
Temperture: 32.4C/90.3F. Humidity: 99.90%
Temperture: 32.4C/90.3F. Humidity: 99.90%
Temperture: 32.4C/90.3F. Humidity: 99.90%
Temperture: 32.5C/90.5F. Humidity: 99.90%
Temperture: 32.4C/90.3F. Humidity: 99.90%
Temperture: 32.4C/90.3F. Humidity: 99.90%
```

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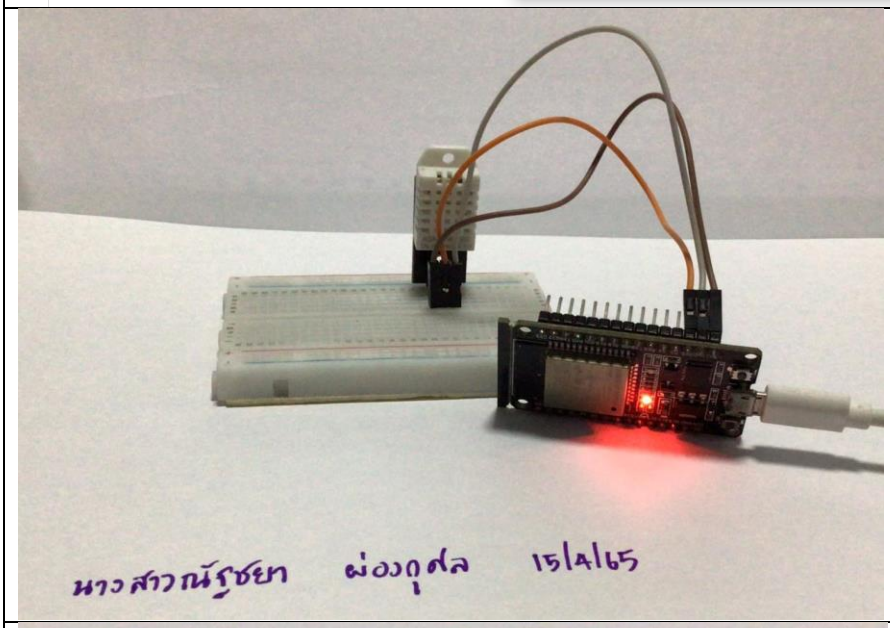
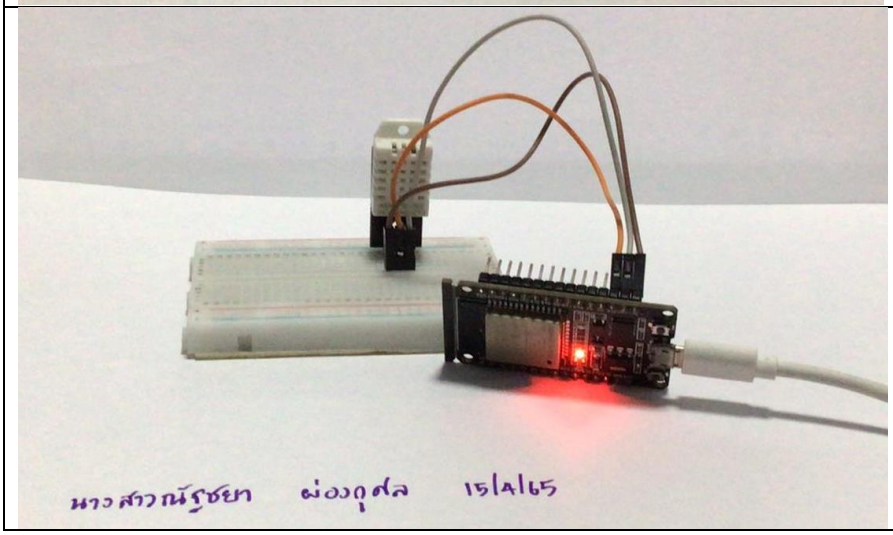
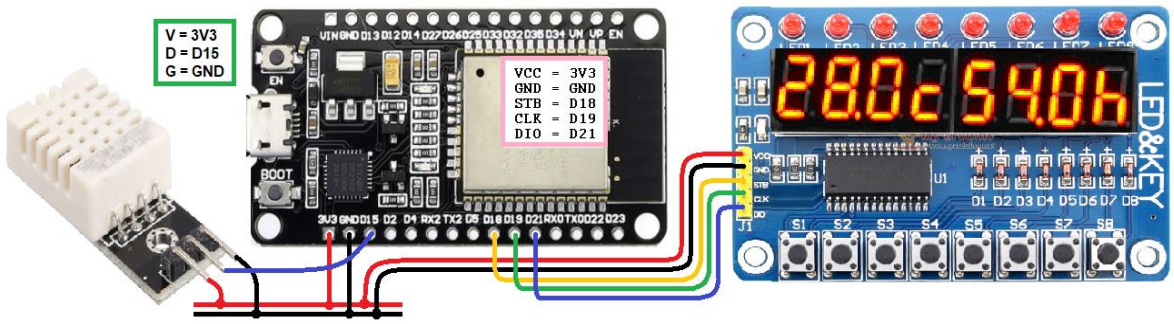




Quiz_103 – Read Sensor and Show

- 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);
}
```

D1

```
#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
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);
}
```

COM3

```
Temperature: 32.00 *C   Humidity: 99.90 %
Temperature: 32.10 *C   Humidity: 99.90 %
Temperature: 32.00 *C   Humidity: 99.90 %
Temperature: 32.10 *C   Humidity: 99.90 %
Temperature: 32.00 *C   Humidity: 99.90 %
Temperature: 32.00 *C   Humidity: 99.90 %
Temperature: 32.10 *C   Humidity: 99.90 %
Temperature: 32.00 *C   Humidity: 99.90 %
Temperature: 32.10 *C   Humidity: 99.90 %
Temperature: 32.00 *C   Humidity: 99.90 %
Temperature: 32.20 *C   Humidity: 99.90 %
Temperature: 32.20 *C   Humidity: 99.90 %
Temperature: 32.20 *C   Humidity: 99.90 %
Temperature: 32.20 *C   Humidity: 99.90 %
Temperature: 32.20 *C   Humidity: 99.90 %
Temperature: 32.20 *C   Humidity: 99.90 %
Temperature: 32.10 *C   Humidity: 99.90 %
Temperature: 32.20 *C   Humidity: 99.90 %
```

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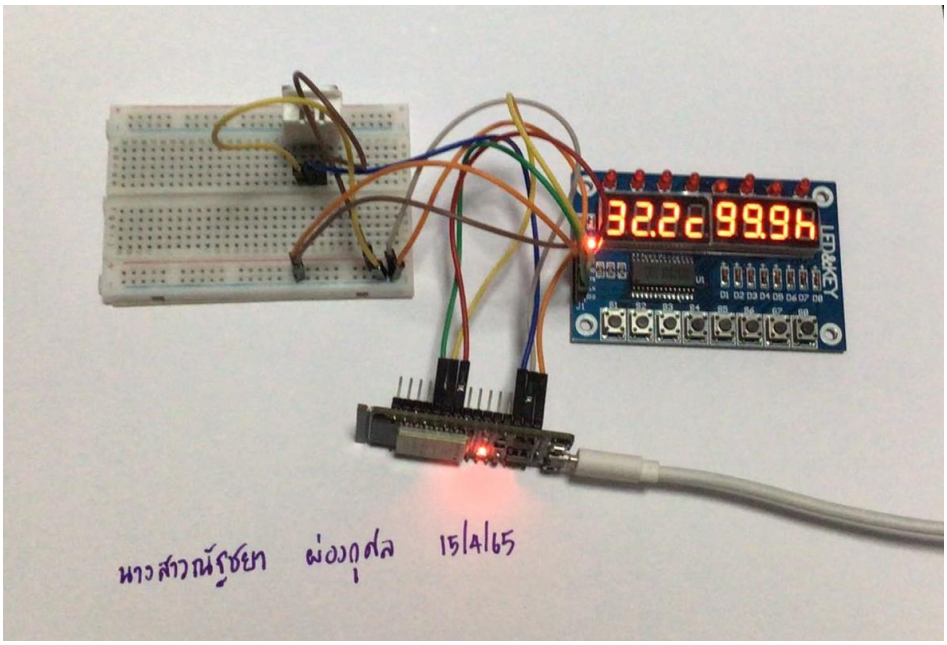
32.2c 99.9h
LEDs&KEY
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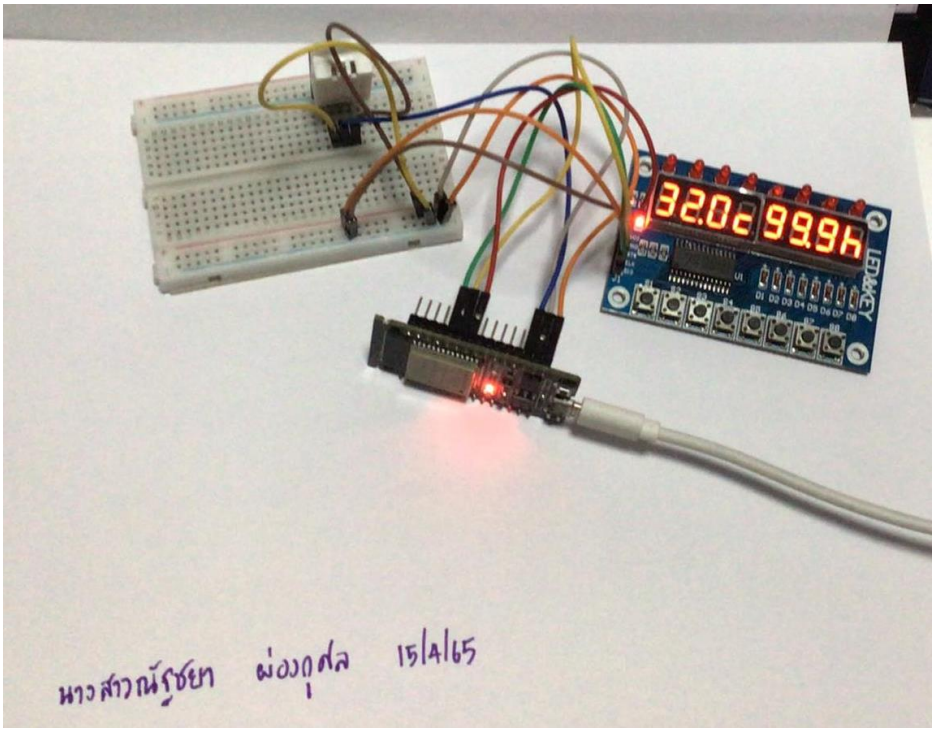
32.0c 99.9h
LEDs&KEY
นางสาวณัฐชยา ผ่องกุศล 15/4/65