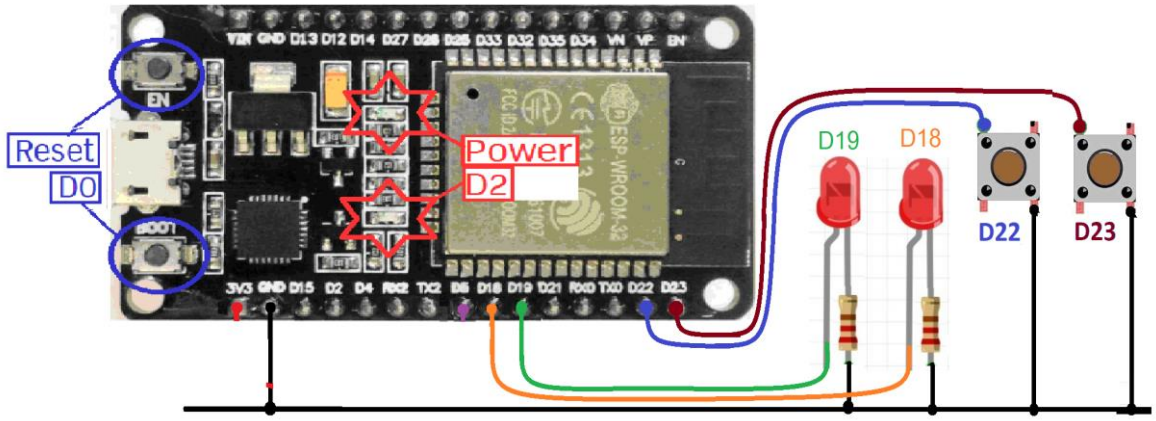
การใช้งาน ThingsBoard IoTs Platform เพื่อสร้างและจัดการระบบอัจริยะ
ThingsBoard IoTs Platform for smart system

ชื่อ-สกุล : วราสิริ ลิ้มประเสริฐ B6214005

6/6 -- คำถามท้ายบทเพื่อทดสอบความเข้าใจ

Quiz_101 – กดติด กดดับ 2 ชุด

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

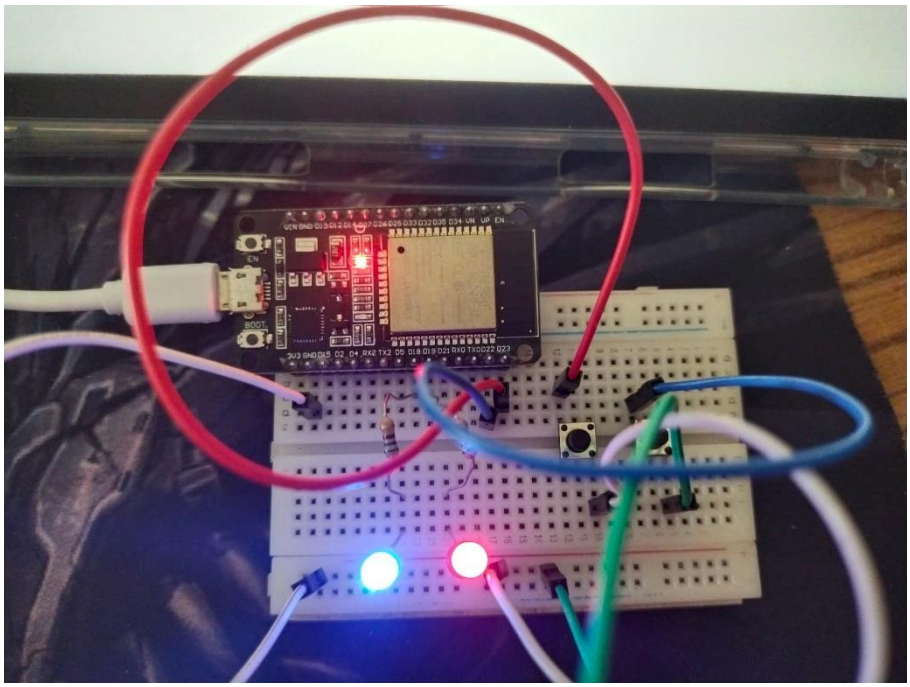


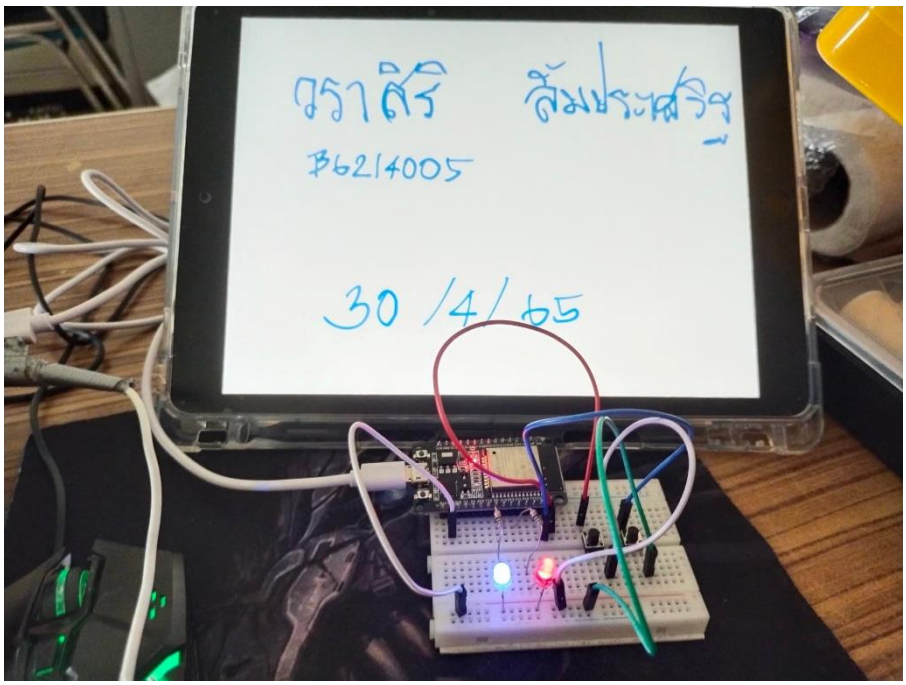

```
#define pushButton1 22
#define pushButton2 23
#define LEDPin1 18
#define LEDPin2 19
int buttonState1 = 0;
int buttonState2 = 0;

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) {
```

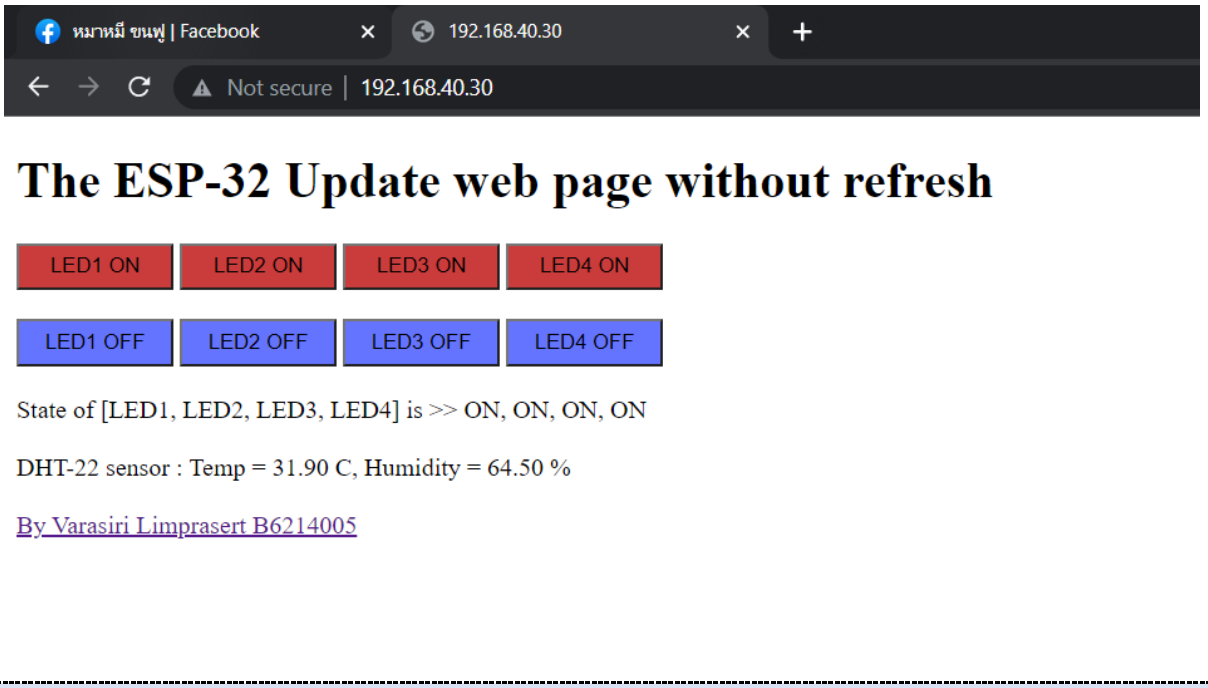
```
    delay(20);
    buttonState2 = 1 - buttonState2;
    digitalWrite(LEDPin2, buttonState2);
    while (digitalRead(pushButton2) == LOW);
    delay(20);
  }
}
```





Quiz_102 – Web Control 4 LED and Monitor Humid/Temperature

- เพิ่มเติมจาก Q202 อยากได้ปุ่มสำหรับคุมปิด-เปิด หลอดไฟ LED 4 ดวง
- อยากมีกด Link ไปที่หน้า FB ของตัวเอง
- https://www.colorhexa.com/008cba?fbclid=IwAR3dIZ_gRgDWmREmnzuknLbMxV3pOHy4YIPuLEz8-ZzTOX2VhWxcH2QjLGk



Code

```
#include <WiFi.h>
#include <WiFiClient.h>
#include <WebServer.h>
#include "DHTesp.h"
#include "index.h" //Our HTML webpage contents with javascripts
#define DHT_Pin 4

#define testLED1 18
#define testLED2 19
#define testLED3 22
#define testLED4 23

//SSID and Password of your WiFi router
const char* ssid = "V2036";
const char* password = "fnafchica";
WebServer server(80); //Server on port 80
DHTesp dht;
String ledState1 = "OFF";
String ledState2 = "OFF";
String ledState3 = "OFF";
```

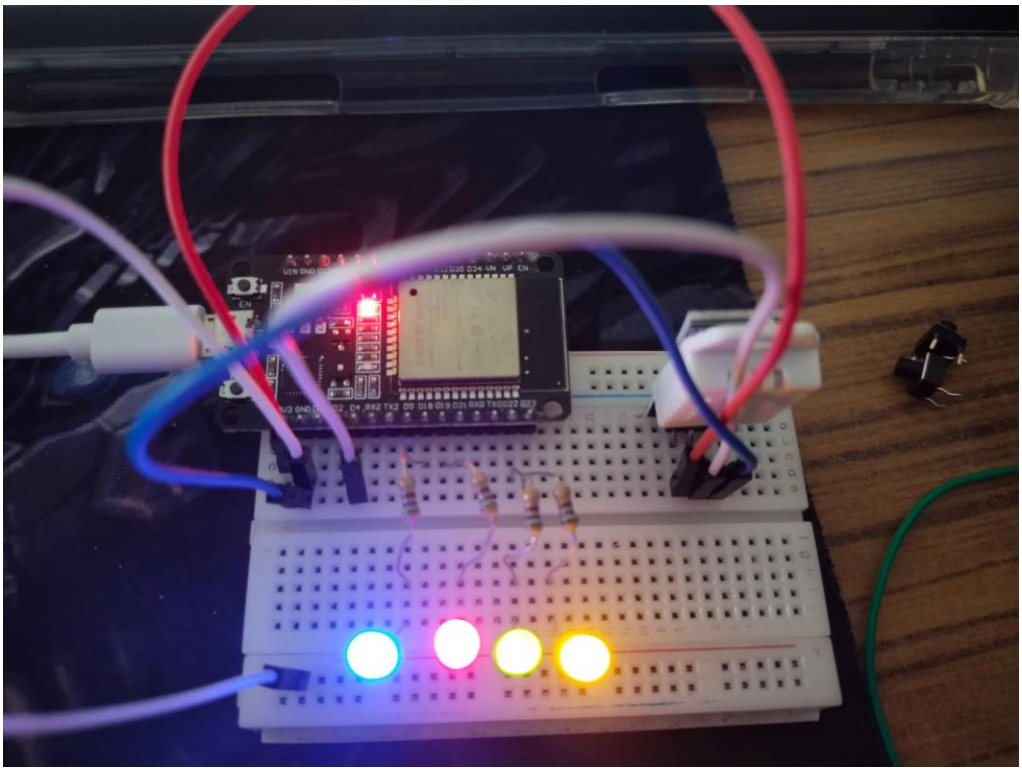
```
String ledState4 = "OFF";
//================================================================
// This routine is executed when you open its IP in browser
//================================================================
void handleRoot() {
  String s = MAIN_page; //Read HTML contents
  server.send(200, "text/html", s); //Send web page
}
void handleADC() {
  float h = dht.getHumidity();
  float t = dht.getTemperature();
  String tmpValue = "Temp = ";
  tmpValue += String(t) + " C, Humidity = ";
  tmpValue += String(h) + " %";
  server.send(200, "text/plane", tmpValue); //Send value to client ajax request
}
void handleLED() {
  String t_state = server.arg("LEDstate"); //Refer xhttp.open("GET", "setLED?LEDstate="+led, true);
  Serial.println(t_state);
  if (t_state == "11") {
    digitalWrite(testLED1, HIGH);  //Feedback parameter
    ledState1 = "ON";
  }
  if (t_state == "10") {
    digitalWrite(testLED1, LOW);  //Feedback parameter
    ledState1 = "OFF";
  }
  if (t_state == "21") {
    digitalWrite(testLED2, HIGH);  //Feedback parameter
    ledState2 = "ON";
  }
  if (t_state == "20") {
    digitalWrite(testLED2, LOW);  //Feedback parameter
    ledState2 = "OFF";
  }
  if (t_state == "31") {
    digitalWrite(testLED3, HIGH);  //Feedback parameter
    ledState3 = "ON";
  }
  if (t_state == "30") {
    digitalWrite(testLED3, LOW);  //Feedback parameter
    ledState3 = "OFF";
  }
  if (t_state == "41") {
    digitalWrite(testLED4, HIGH);  //Feedback parameter
    ledState4 = "ON";
  }
```

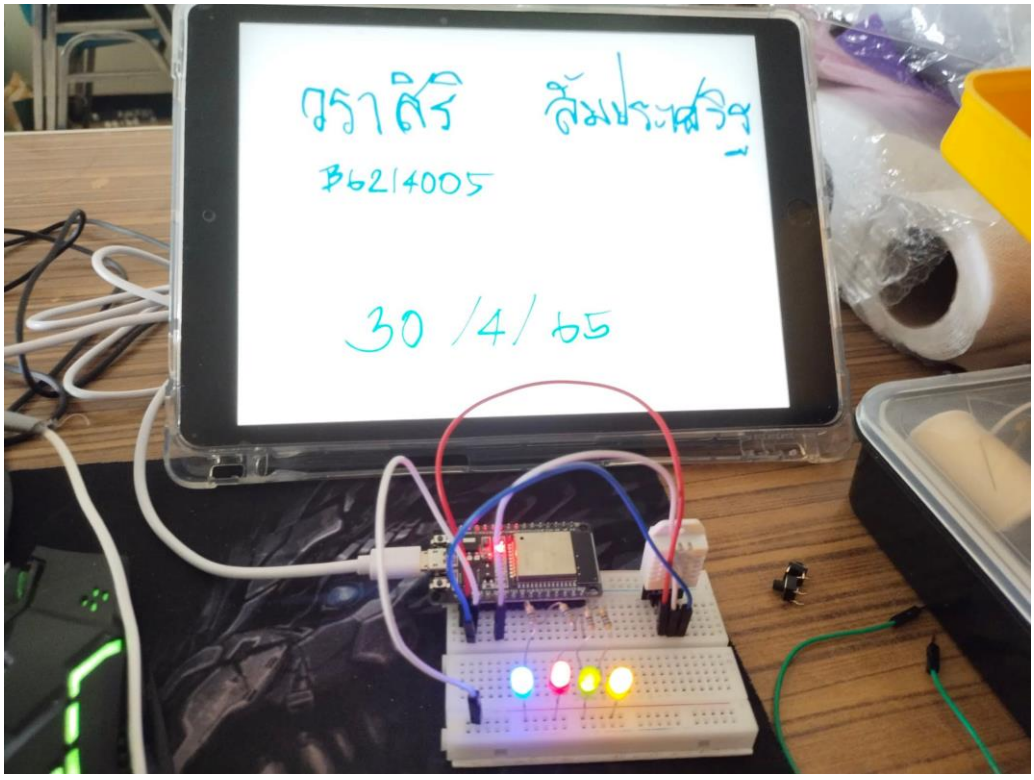
```
  if (t_state == "40") {
    digitalWrite(testLED4, LOW);  //Feedback parameter
    ledState4 = "OFF";
  }
  server.send(200, "text/plane", ledState1 + ", " + ledState2 + ", " + ledState3 + ", " + ledState4); //Send web page
}
void setup(void) {
  Serial.begin(115200);
  dht.setup(DHT_Pin, DHTesp::DHT22); // DHT_Pin D4, DHT22
  pinMode(testLED1, OUTPUT);
  pinMode(testLED2, OUTPUT);
  pinMode(testLED3, OUTPUT);
  pinMode(testLED4, OUTPUT);
  Serial.print("\n\nConnect to ");
  Serial.println(ssid);
  WiFi.begin(ssid, password);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500); Serial.print(".");
  }
  Serial.print("\nConnected "); Serial.println(ssid);
  Serial.print("IP address: "); Serial.println(WiFi.localIP());
  server.on("/", handleRoot);
  server.on("/setLED", handleLED);
  server.on("/readADC", handleADC);
  server.begin();
  Serial.println("HTTP server started");
}
void loop(void) {
  server.handleClient(); //Handle client requests
}
```

Index.h

```
const char MAIN_page[] PROGMEM = R"=====(
<!DOCTYPE html>
<html>
<body>
<div id="demo">
<h1>The ESP-32 Update web page without refresh</h1>
<button type="button" onclick="sendData(11)" style="background: rgb(202, 60, 60);width:100px;height:30px">LED1
ON</button>
<button type="button" onclick="sendData(21)" style="background: rgb(202, 60, 60);width:100px;height:30px">LED2
ON</button>
<button type="button" onclick="sendData(31)" style="background: rgb(202, 60, 60);width:100px;height:30px">LED3
ON</button>
```

```
<button type="button" onclick="sendData(41)" style="background: rgb(202, 60, 60);width:100px;height:30px">LED4
ON</button><br><br>
<button type="button" onclick="sendData(10)" style="background:
rgb(100,116,255);width:100px;height:30px">LED1 OFF</button>
<button type="button" onclick="sendData(20)" style="background:
rgb(100,116,255);width:100px;height:30px">LED2 OFF</button>
<button type="button" onclick="sendData(30)" style="background:
rgb(100,116,255);width:100px;height:30px">LED3 OFF</button>
<button type="button" onclick="sendData(40)" style="background:
rgb(100,116,255);width:100px;height:30px">LED4 OFF</button><br><br>
State of [LED1, LED2, LED3, LED4] is >> <span id="LEDState">/span><br>
</div>
<div>
<br>DHT-22 sensor : <span id="ADCValue">0</span><br>
</div>
<script>
function sendData(led) {
var xhttp = new XMLHttpRequest();
xhttp.onreadystatechange = function() {
if (this.readyState == 4 && this.status == 200) {
document.getElementById("LEDState").innerHTML =
this.responseText;
}
};
xhttp.open("GET", "setLED?LEDstate="+led, true);
xhttp.send();
}
setInterval(function() {
// Call a function repetatively with 2 Second interval
getData();
}, 2000); //2000mSeconds update rate
function getData() {
var xhttp = new XMLHttpRequest();
xhttp.onreadystatechange = function() {
if (this.readyState == 4 && this.status == 200) {
document.getElementById("ADCValue").innerHTML =
this.responseText;
}
};
xhttp.open("GET", "readADC", true);
xhttp.send();
}
</script>
<br><a href="https://www.facebook.com/chi.sweethome.50/">By Varasiri Limprasert B6214005</a>
</body>
</html>
)=====";
```

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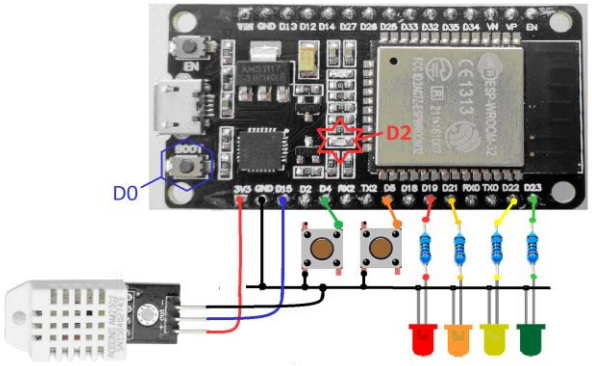
Quiz_103 – Pub/Sub Data from (DHT22 + 4 LED + 2 Switch)

- อ่านค่า DHT-22 แล้วส่งไปยัง MQTT Broker ทุกๆ 5 วินาที
- กำหนดให้ใช้ mqtt.eclipse.org เป็น Broker
- ควบคุมการปิดเปิด 4 LED
- รับค่าสวิตซ์กำหนด SW1 แจ้ง Overheat Alarm, SW2 แจ้ง Intruders Alarm

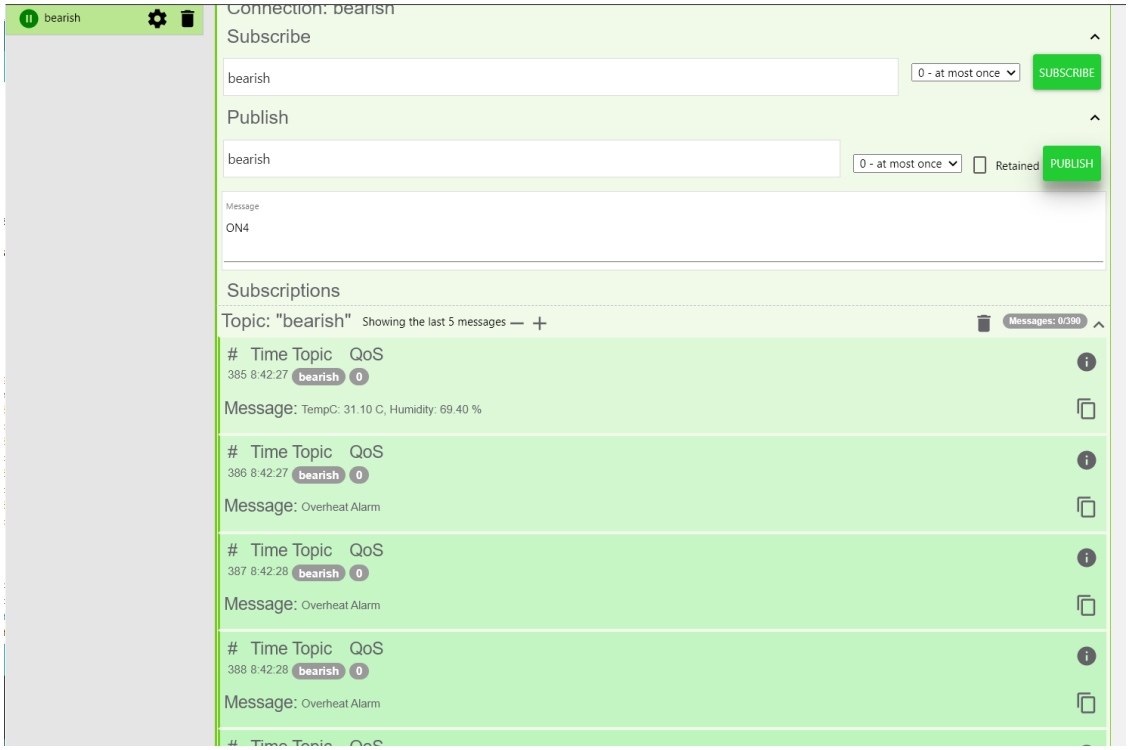


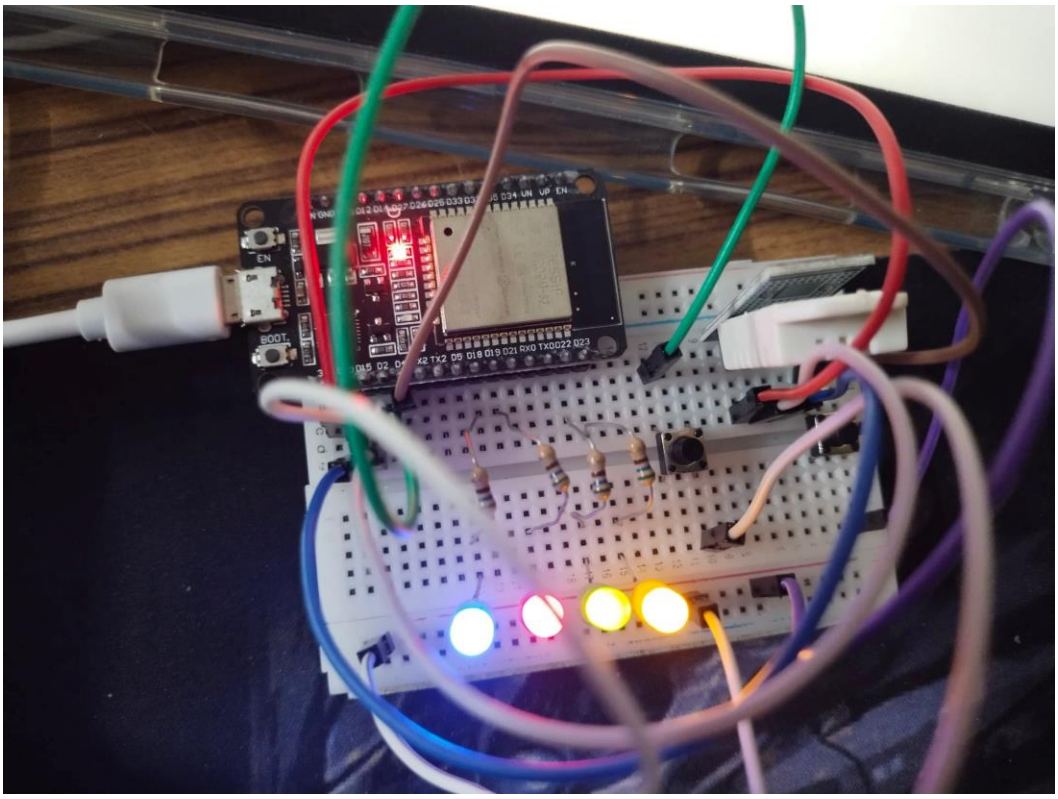

```
#include <WiFi.h>
#include <Wire.h>
#include <PubSubClient.h>
#include "DHTesp.h"
DHTesp dht;

#define testLED1 18
#define testLED2 19
#define testLED3 22
#define testLED4 23
#define DHT22_Pin 15

const char* ssid = "V2036";
const char* password = "fnafchica";
const char* mqtt_server = "test.mosquitto.org";
const char* topic1 = "bearish";

String ledState1 = "NA";
int pushButton1 = 2;
int pushButton2 = 4;

WiFiClient espClient;
PubSubClient client(espClient);
long lastMsg = 0;
char msg[50];
int value = 0;

void setup_wifi() {
  delay(10);
  Serial.println();
```

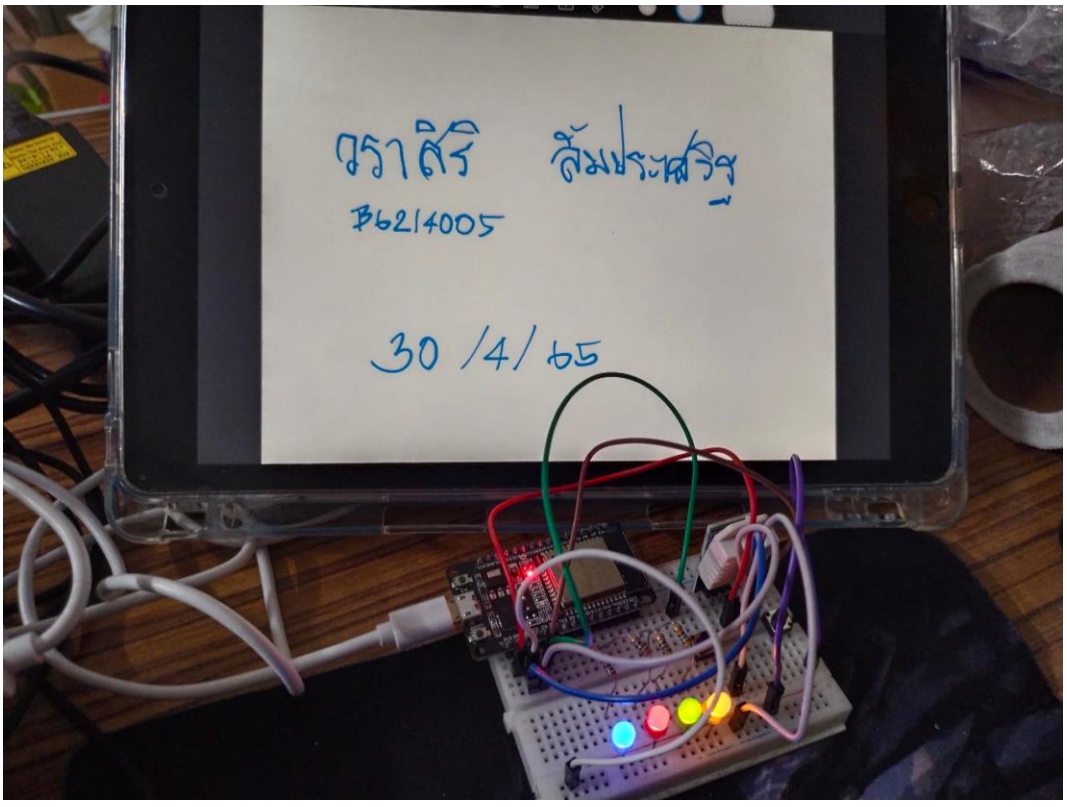
```
  Serial.print("Connecting to ");
  Serial.println(ssid);
  WiFi.begin(ssid, password);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500); Serial.print(".");
  }
  randomSeed(micros());
  Serial.println("");
  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());
  pinMode(testLED1, OUTPUT);
  pinMode(testLED2, OUTPUT);
  pinMode(testLED3, OUTPUT);
  pinMode(testLED4, OUTPUT);
}

void callback(char* topic, byte* payload, unsigned int length)
{ char myPayLoad[50];
  Serial.print("Message arrived [");
  Serial.print(topic1);
  Serial.print("] ");
  for (int i = 0; i < length; i++)
  { Serial.print((char)payload[i]);
    myPayLoad[i] = payload[i];
    myPayLoad[i + 1] = '\0'; // End of String
  }
  Serial.print("\n ---> "); Serial.println(myPayLoad);
  myPayLoad[4] = '\0'; // String lessthan 4 Charector
  if ((String)myPayLoad == "ON1") digitalWrite(testLED1, HIGH);
  if ((String)myPayLoad == "OFF1") digitalWrite(testLED1, LOW);
  if ((String)myPayLoad == "ON2") digitalWrite(testLED2, HIGH);
  if ((String)myPayLoad == "OFF2") digitalWrite(testLED2, LOW);
  if ((String)myPayLoad == "ON3") digitalWrite(testLED3, HIGH);
  if ((String)myPayLoad == "OFF3") digitalWrite(testLED3, LOW);
  if ((String)myPayLoad == "ON4") digitalWrite(testLED4, HIGH);
  if ((String)myPayLoad == "OFF4") digitalWrite(testLED4, LOW);
}

void reconnect()
{ while (!client.connected()) // Loop until we're reconnected
  { Serial.print("Attempting MQTT connection...");
    String clientId = "ESP8266Client-";
    clientId += String(random(0xffff), HEX); // Create a random client ID
    if (client.connect(clientId.c_str())) // Attempt to connect
    { Serial.println("connected"); // Once connected, publish an announcement...
      client.publish(topic1, "Hello World Pk007"); // ... and resubscribe
```

```
      client.subscribe(topic1);
    } else
    { Serial.print("failed, rc=");
      Serial.print(client.state());
      Serial.println(" try again in 5 seconds");
      delay(5000);
    }
  }
}

void setup()
{ Serial.begin(115200);
  setup_wifi();
  dht.setup(DHT22_Pin, DHTesp::DHT22);
  pinMode(pushButton1, INPUT_PULLUP);
  pinMode(pushButton2, INPUT_PULLUP);
  client.setServer(mqtt_server, 1883);
  client.setCallback(callback);
  pinMode(testLED1, OUTPUT);
  pinMode(testLED2, OUTPUT);
  pinMode(testLED3, OUTPUT);
  pinMode(testLED4, OUTPUT);
}

void loop()
{
  if (!client.connected()) reconnect();
  client.loop();
  long now = millis();
  if (now - lastMsg > 5000)
  { lastMsg = now;
    ++value;
    float h = dht.getHumidity();
    float t = dht.getTemperature();
    sprintf (msg, "TempC: %.2f C, Humidity: %.2f %%", t, h);
    Serial.print("Publish message: ");
    Serial.println(msg);
    client.publish(topic1, msg);
  }
  if (digitalRead(pushButton1) == 0) {
    sprintf (msg, "Overheat Alarm");
    Serial.println(msg);
    client.publish(topic1, msg);
    delay(500);
  }
  if (digitalRead(pushButton2) == 0) {
    sprintf (msg, "Intruders Alarm");
```

```
    Serial.println(msg);
    client.publish(topic1, msg);
    delay(500);
  }
}
```



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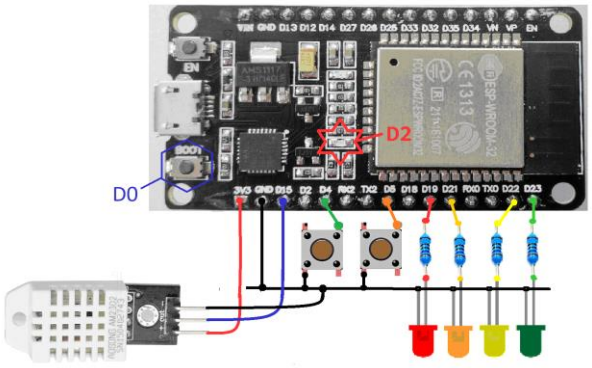
Quiz_104 – Blynk and LINE from (DHT22 + 4 LED + 2 Switch)

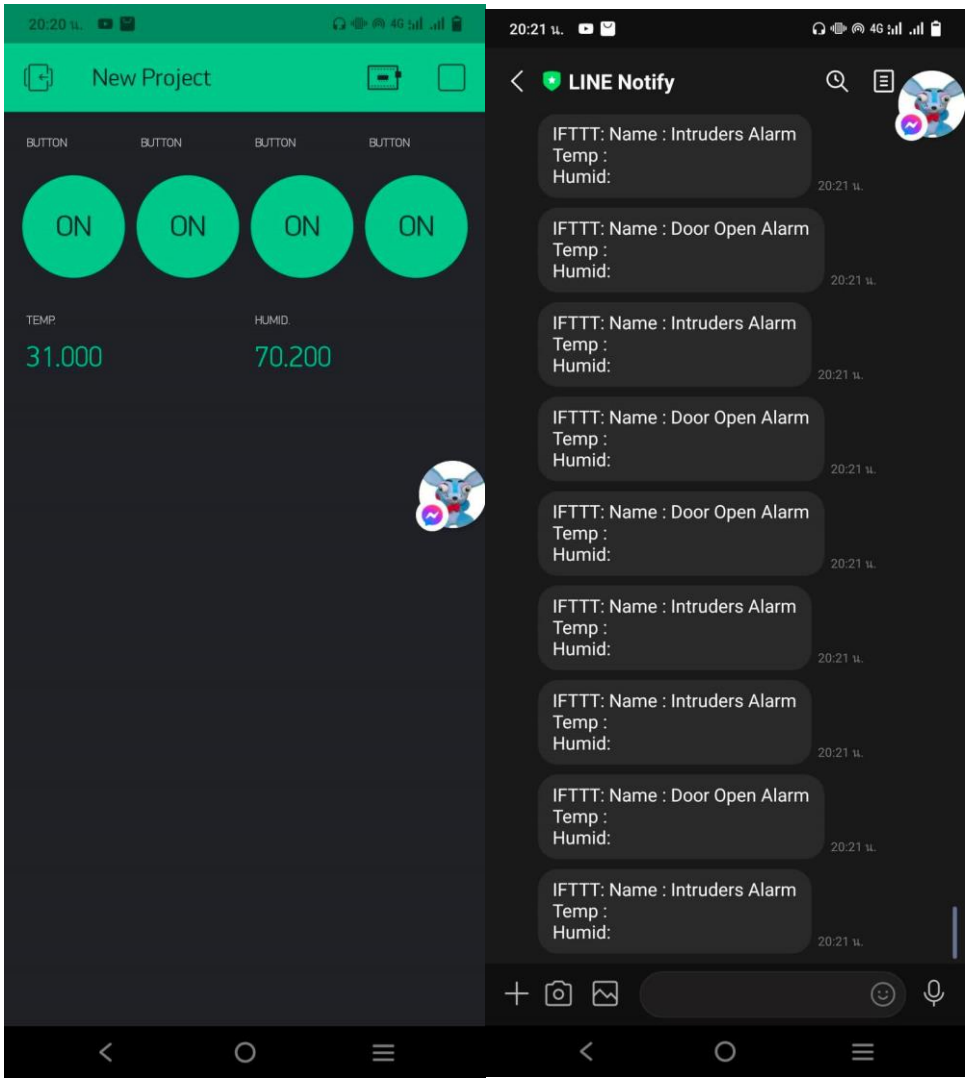
- ควบคุมการปิดเปิด 4 LED
- อ่านค่า DHT-22 แล้วส่งไปยัง Blynk ทุกๆ 5 วินาที
- บันทึกค่าไปยัง Google Sheet
- หากอุณหภูมิเกิน 28'C ให้แจ้งไปยัง LINE
- รับค่าสวิตซ์กำหนด SW1 แจ้ง Overheat Alarm, SW2 แจ้ง Intruders Alarm ไปยัง LINE

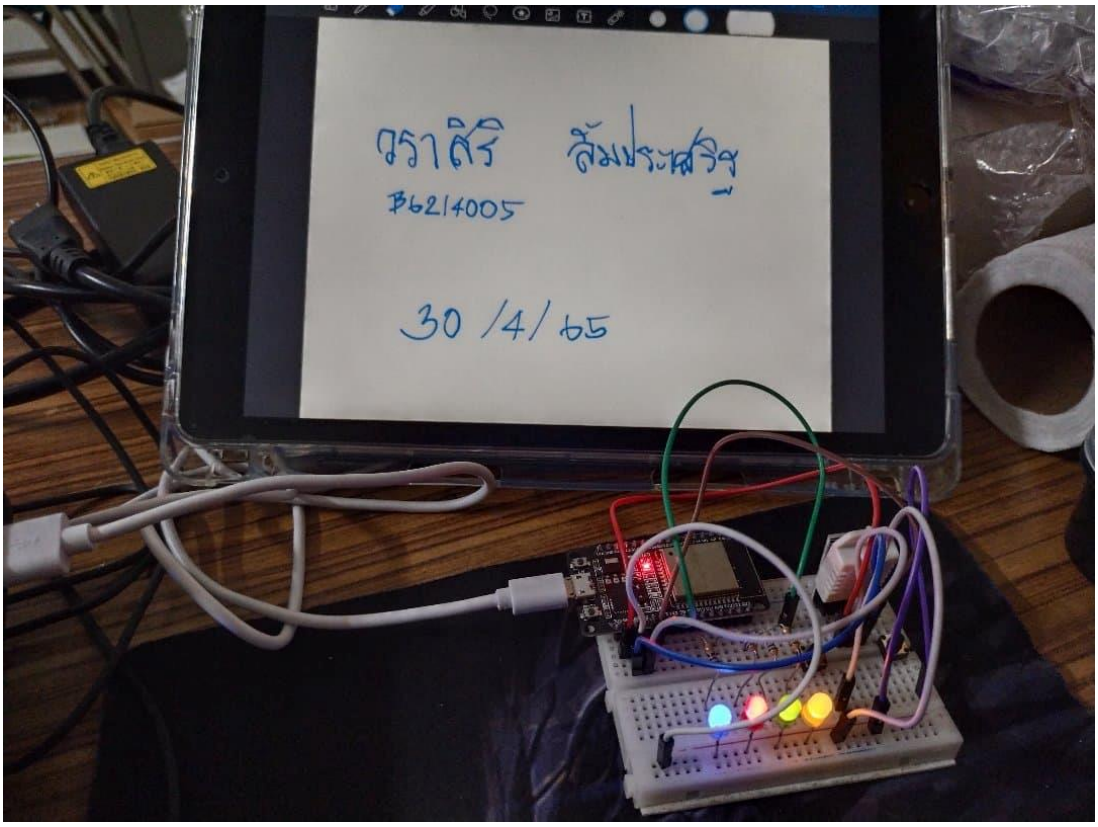



```
#define BLYNK_PRINT Serial
#include <WiFi.h>
#include <HTTPClient.h>
#include <WiFiClient.h>
#include <BlynkSimpleEsp32.h>
#include "DHTesp.h"
#define DHT22_Pin 15
#define sw1 2
#define sw2 4

#define WebHooksKey "oXSQX-hS7mc2o1blAA3UlubXBXN2WIrMllheoCkvYQI"
#define WebHooksEventName "Test_Key"
char auth[] = "Y1ccpnuLjmwpjmQ1n_ZqSVxraOe88oHp";
char ssid[] = "V2036";
char pass[] = "fnafchica";

DHTesp dht;
WidgetLED LED1(V2);
WidgetLED LED2(V3);
BlynkTimer timer;

void setup() {
  Serial.begin(115200);
  dht.setup(DHT22_Pin, DHTesp::DHT22); // Connect DHT sensor to GPIO 15
  pinMode(sw1, INPUT_PULLDOWN);
  pinMode(sw2, INPUT_PULLDOWN);
  Blynk.begin(auth, ssid, pass);
  timer.setInterval(1000L, myTimerEvent);
}
```

```
void myTimerEvent() {
  float humidity = dht.getHumidity();
  float temperature = dht.getTemperature();
  Blynk.virtualWrite(V0, temperature);
  Blynk.virtualWrite(V1, humidity);
  if (digitalRead(sw1)) LED1.on();
  else LED1.off();
  if (digitalRead(sw2)) LED2.on();
  else LED2.off();
  Serial.print(" Temp('C) >> "); Serial.print(temperature, 1);
  Serial.print(", Humidity(%) >> "); Serial.println(humidity, 1);
}

void loop()
{
  Blynk.run();
  if (digitalRead(sw1) == LOW) {
    String serverName = "http://maker.ifttt.com/trigger/" +
                        String(WebHooksEventName) + "/with/key/" + String(WebHooksKey);
    String httpRequestData = "value1=" + String("Door Open Alarm");
    Serial.println("Server Name :" + serverName);
    Serial.println("json httpRequestData :" + httpRequestData);
    if (WiFi.status() == WL_CONNECTED) {
      HTTPClient http;
      http.begin(serverName);
      http.addHeader("Content-Type", "application/x-www-form-urlencoded");
      int httpResponseCode = http.POST(httpRequestData);
      Serial.print("HTTP Response code: ");
      Serial.println(httpResponseCode);
      http.end();
      if (httpResponseCode == 200)
        Serial.println("Successfully sent");
      else
        Serial.println("Failed!");
    }
    else {
      Serial.println("WiFi Disconnected");
    }
  }
  if (digitalRead(sw2) == LOW) {
    String serverName = "http://maker.ifttt.com/trigger/" +
                        String(WebHooksEventName) + "/with/key/" + String(WebHooksKey);
    String httpRequestData = "value1=" + String("Intruders Alarm");
    Serial.println("Server Name :" + serverName);
    Serial.println("json httpRequestData :" + httpRequestData);
    if (WiFi.status() == WL_CONNECTED) {
      HTTPClient http;
```

```
    http.begin(serverName);
    http.addHeader("Content-Type", "application/x-www-form-urlencoded");
    int httpResponseCode = http.POST(httpRequestData);
    Serial.print("HTTP Response code: ");
    Serial.println(httpResponseCode);
    http.end();
    if (httpResponseCode == 200)
      Serial.println("Successfully sent");
    else
      Serial.println("Failed!");
  }
  else {
    Serial.println("WiFi Disconnected");
  }
  timer.run(); // running timer every 250ms
 }
}
```

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