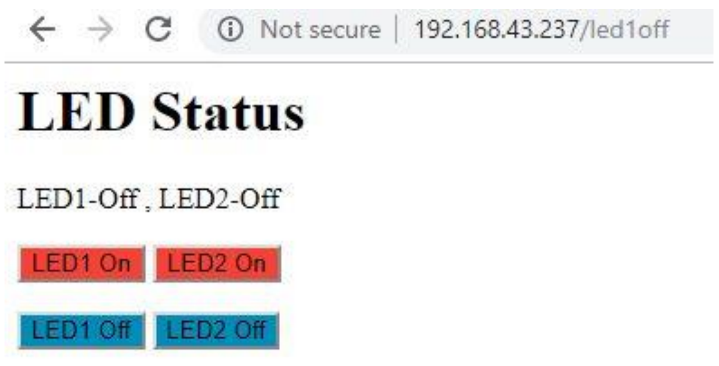
แนวทางการใช้งานอินเทอร์เน็ตของสรรพสิ่งในระบบการผลิต
IoT Approaches to Manufacturing System

ชื่อ-สกุล : นางสาวณัฐชยา ผ่องกุศล B6226718

4/4. คำถามท้ายบทเพื่อทดสอบความเข้าใจ

Quiz_201 – Web Control 2 LED

- อยากได้ปุ่มสำหรับคุมปิด-เปิด หลอดไฟ LED 2 ดวง
- https://www.colorhexa.com/008cba?fbclid=IwAR3dIZ_gRgDWmREmnzuknLbMxV3pOHy4YIPuLEz8-ZzTOX2VhWxcH2QjLGk



LED Status

LED1-Off , LED2-Off

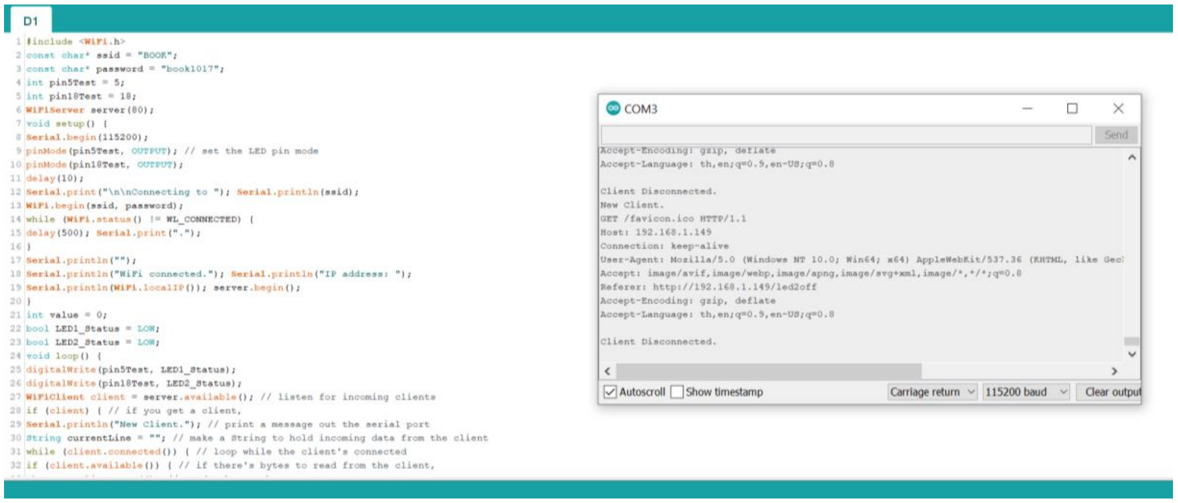
```
#include <WiFi.h>
const char* ssid = "BOOK";
const char* password = "book1017";
int pin5Test = 5;
int pin18Test = 18;
WiFiServer server(80);
void setup() {
Serial.begin(115200);
pinMode(pin5Test, OUTPUT); // set the LED pin mode
pinMode(pin18Test, OUTPUT);
delay(10);
Serial.print("\n\nConnecting to "); Serial.println(ssid);
WiFi.begin(ssid, password);
while (WiFi.status() != WL_CONNECTED) {
delay(500); Serial.print(".");
```

```
}
Serial.println("");
Serial.println("WiFi connected."); Serial.println("IP address: ");
Serial.println(WiFi.localIP()); server.begin();
}
int value = 0;
bool LED1_Status = LOW;
bool LED2_Status = LOW;
void loop() {
digitalWrite(pin5Test, LED1_Status);
digitalWrite(pin18Test, LED2_Status);
WiFiClient client = server.available(); // listen for incoming clients
if (client) { // if you get a client,
Serial.println("New Client."); // print a message out the serial port
String currentLine = ""; // make a String to hold incoming data from the client
while (client.connected()) { // loop while the client's connected
if (client.available()) { // if there's bytes to read from the client,
char c = client.read(); // read a byte, then
Serial.write(c); // print it out the serial monitor
if (c == '\n') { // if the byte is a newline character
if (currentLine.length() == 0) {
client.println("HTTP/1.1 200 OK");
client.println("Content-type:text/html");
client.println();
client.println("<html>");
client.println("<body>");
client.println("<h1>LED Status</h1>");
client.println("<p>");
if (LED1_Status == HIGH)
client.println("LED1-On");
else
client.println("LED1-Off");

if (LED2_Status == HIGH)
client.println("LED2-On");
else
client.println("LED2-Off"); //client.println("<a
href=\"/ledon\"><button>LEDn</button></a>");
client.println("<br />");
client.println("<a href=\"/led1on\"><button style = \"background-
color:#f44336;\">LED1 On</button></a>");
client.println("<a href=\"/led2on\"><button style = \"background-
color:#f44336;\">LED2 On</button></a>");
client.println("</p>");//client.println("<a
href=\"/ledoff\"><button>LEDOff</button></a>");
client.println("<a href=\"/led1off\"><button style = \"background-
color:#008CBA;\">LED1 Off</button></a>");
client.println("<a href=\"/led2off\"><button style = \"background-
color:#008CBA;\">LED2 Off</button></a>");
client.println("<body>");
client.println("<br />");
client.println("<html>");
break;
} else {
currentLine = "";
}
} else if (c != '\r') {
```

```
currentLine += c;
}
//Led1
if (currentLine.endsWith("GET /led1on")) LED1_Status = HIGH;
if (currentLine.endsWith("GET /led1off")) LED1_Status = LOW;

//Led2
if (currentLine.endsWith("GET /led2on")) LED2_Status = HIGH;
if (currentLine.endsWith("GET /led2off")) LED2_Status = LOW;
}
}
client.stop(); // close the connection:
Serial.println("Client Disconnected.");
}
}
```



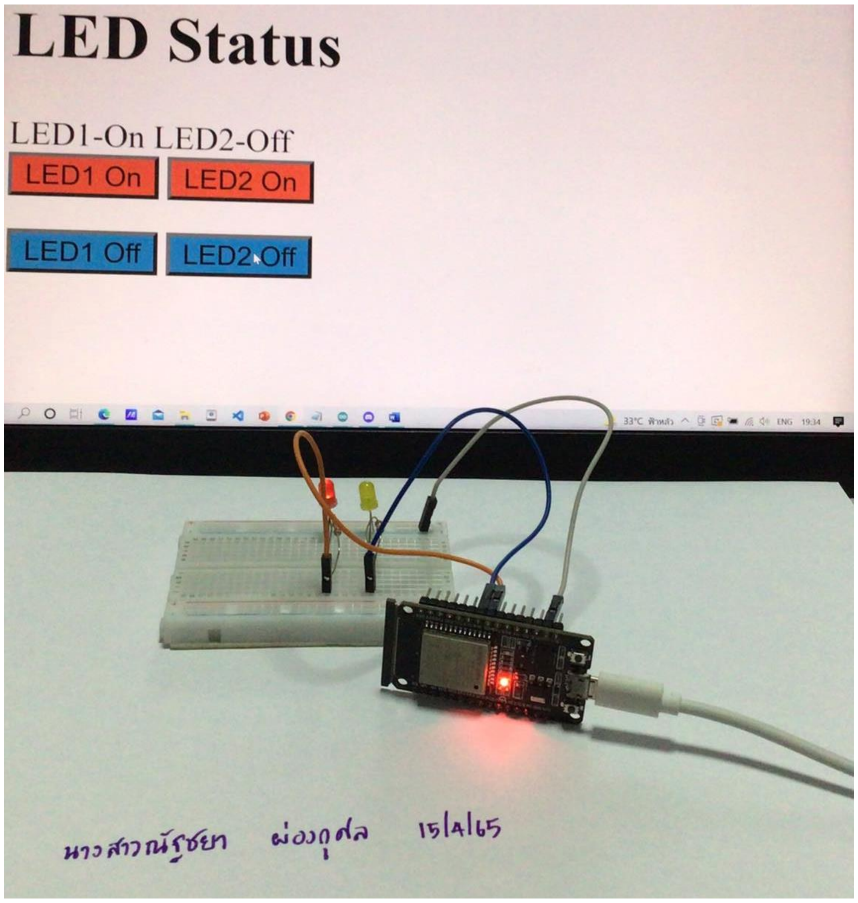
```
#include <WiFi.h>
const char* ssid = "BOOK";
const char* password = "book1017";
int pin5Test = 5;
int pin18Test = 18;
WiFiServer server(80);
void setup() {
Serial.begin(115200);
pinMode(pin5Test, OUTPUT); // set the LED pin mode
pinMode(pin18Test, OUTPUT);
delay(10);
Serial.print("\n\nConnecting to "); Serial.println(ssid);
WiFi.begin(ssid, password);
while (WiFi.status() != WL_CONNECTED) {
delay(500); Serial.print(".");
}
Serial.println("");
Serial.println("WiFi connected."); Serial.println("IP address: ");
Serial.println(WiFi.localIP()); server.begin();
}
int value = 0;
bool LED1_Status = LOW;
bool LED2_Status = LOW;
void loop() {
digitalWrite(pin5Test, LED1_Status);
digitalWrite(pin18Test, LED2_Status);
WiFiClient client = server.available(); // listen for incoming clients
if (client) { // if you get a client,
Serial.println("New Client."); // print a message out the serial port
String currentLine = ""; // make a String to hold incoming data from the client
while (client.connected()) { // loop while the client's connected
if (client.available()) { // if there's bytes to read from the client,
```

```
Accept-Encoding: gzip, deflate
Accept-Language: th,en;q=0.9,en-US;q=0.8

Client Disconnected.
New Client.
GET /favicon.ico HTTP/1.1
Host: 192.168.1.149
Connection: keep-alive
User-Agent: Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gec
Accept: image/avif,image/webp,image/apng,image/svg+xml,image/*,*/*;q=0.8
Referer: http://192.168.1.149/led2off
Accept-Encoding: gzip, deflate
Accept-Language: th,en;q=0.9,en-US;q=0.8

Client Disconnected.
```

[✓] Autoscroll [ ] Show timestamp Carriage return 115200 baud


LED Status
LED1-On LED2-Off
LED1 On
LED2 On
LED1 Off
LED2 Off
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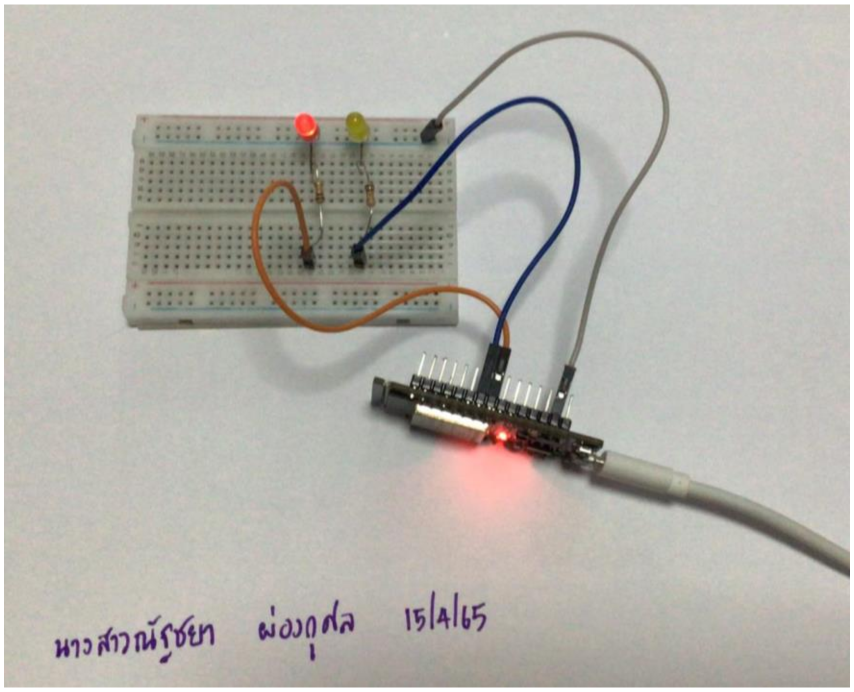
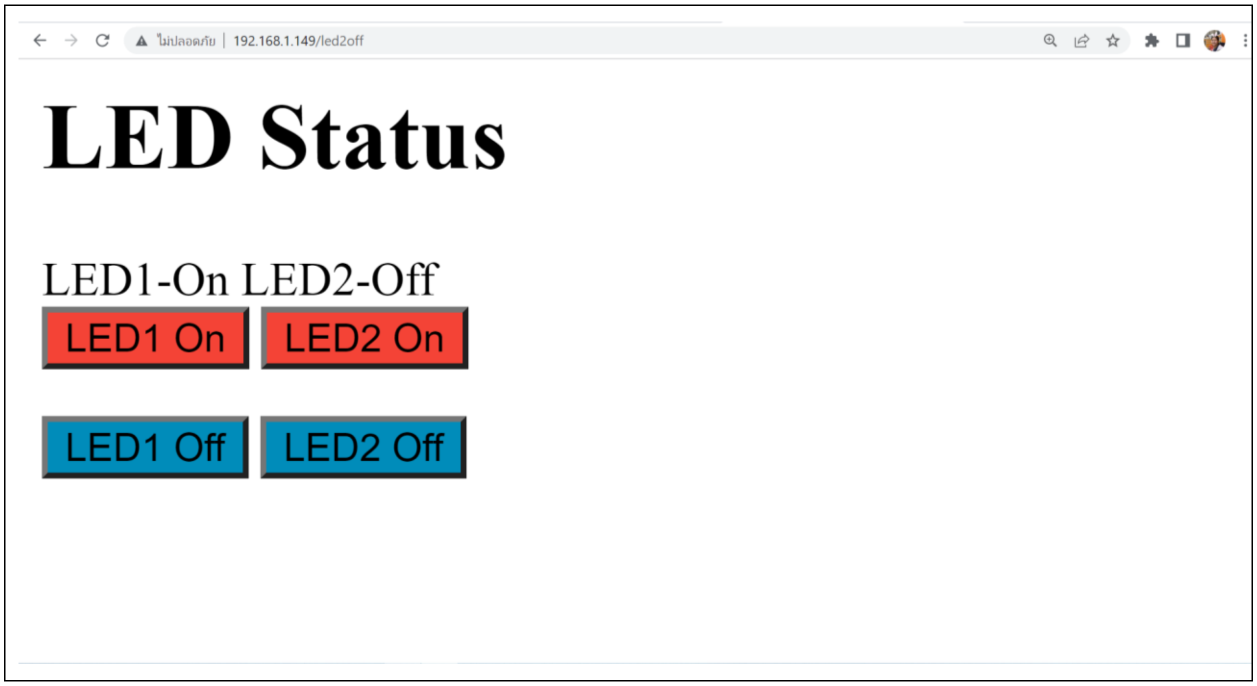

นางสาวณัฐชยา ผ่องกุศล 15/4/65

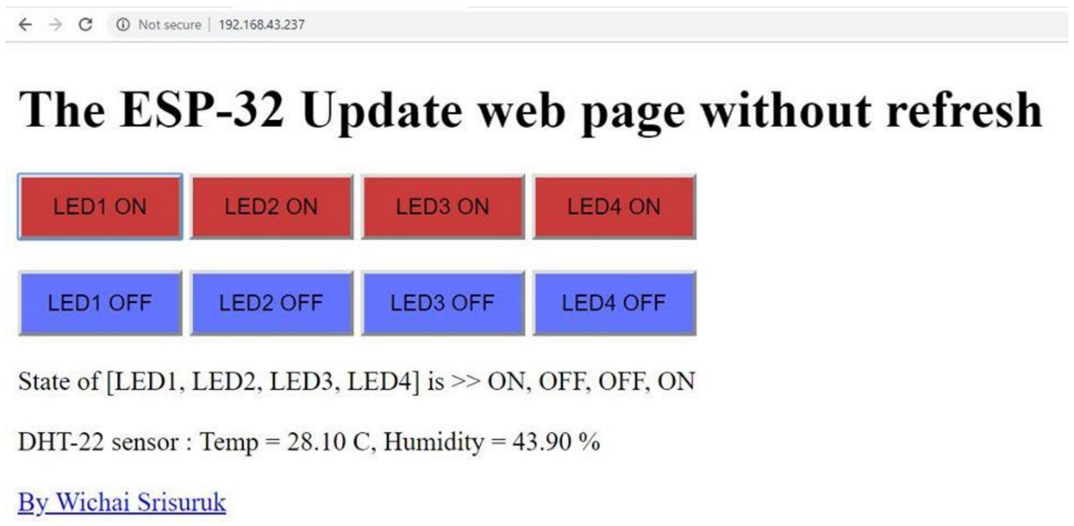


LED Status

LED1-On LED2-Off

Quiz_202 – Web Control 4 LED and Monitor Humid/Temperature

- เพิ่มเติมจาก Q202 อยากได้ปุ่มสำหรับคุมปิด-เปิด หลอดไฟ LED 4 ดวง
- อยากมีกด Link ไปที่หน้า FB ของตัวเอง



The ESP-32 Update web page without refresh

State of [LED1, LED2, LED3, LED4] is >> ON, OFF, OFF, ON

DHT-22 sensor : Temp = 28.10 C, Humidity = 43.90 %

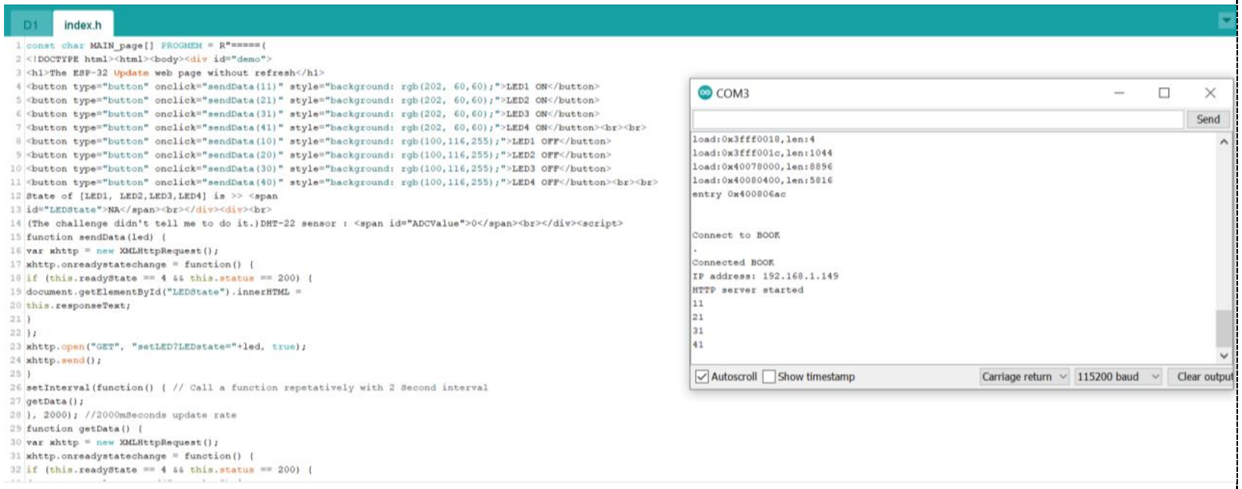
By Wichai Srisuruk

```
#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 = "BOOK";
const char* password = "book1017";
WebServer server(80); //Server on port 80
DHTesp dht;
String ledState1 = "NA";
String ledState2 = "NA";
String ledState3 = "NA";
String ledState4 = "NA";
//=============================================================
======
// 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
}
```

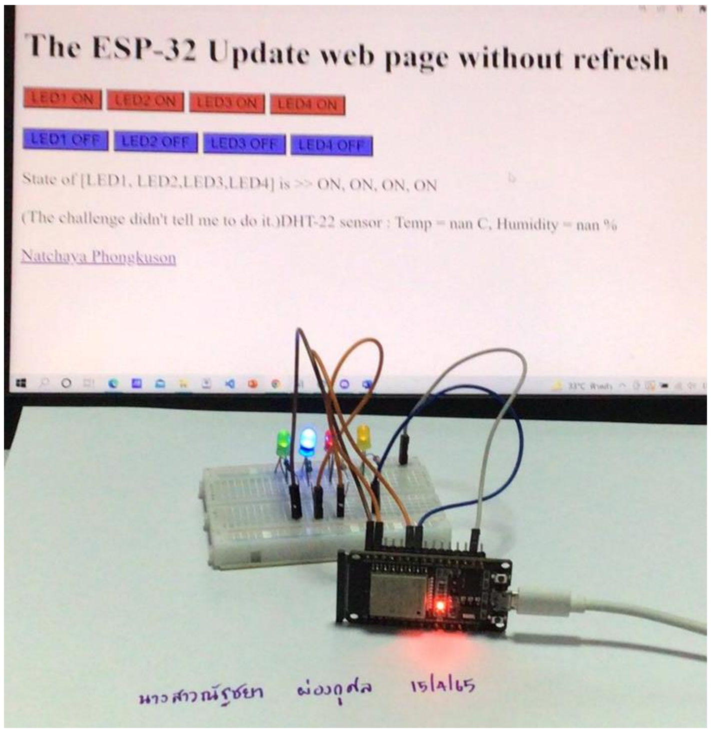
```
//index.h
const char MAIN_page[] PROGMEM = R"=====(
<!DOCTYPE html><html><body><div id="demo">
<h1>The ESP-32 Update web page without refresh</h1>
<button type="button" onclick="sendData(11)" style="background: rgb(202,
60,60);">LED1 ON</button>
<button type="button" onclick="sendData(21)" style="background: rgb(202,
60,60);">LED2 ON</button>
<button type="button" onclick="sendData(31)" style="background: rgb(202,
60,60);">LED3 ON</button>
<button type="button" onclick="sendData(41)" style="background: rgb(202,
60,60);">LED4 ON</button><br><br>
<button type="button" onclick="sendData(10)" style="background:
rgb(100,116,255);">LED1 OFF</button>
<button type="button" onclick="sendData(20)" style="background:
rgb(100,116,255);">LED2 OFF</button>
<button type="button" onclick="sendData(30)" style="background:
rgb(100,116,255);">LED3 OFF</button>
<button type="button" onclick="sendData(40)" style="background:
rgb(100,116,255);">LED4 OFF</button><br><br>
State of [LED1, LED2,LED3,LED4] is >> <span
id="LEDState">NA</span><br></div><div><br>
(The challenge didn't tell me to do it.)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/profile.php?id=100007563972020">Natchaya
Phongkuson</a></body></html>
)=====";
```



```
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);">LED1 ON</button>
<button type="button" onclick="sendData(21)" style="background: rgb(202, 60,60);">LED2 ON</button>
<button type="button" onclick="sendData(31)" style="background: rgb(202, 60,60);">LED3 ON</button>
<button type="button" onclick="sendData(41)" style="background: rgb(202, 60,60);">LED4 ON</button><br><br>
<button type="button" onclick="sendData(10)" style="background: rgb(100,116,255);">LED1 OFF</button>
<button type="button" onclick="sendData(20)" style="background: rgb(100,116,255);">LED2 OFF</button>
<button type="button" onclick="sendData(30)" style="background: rgb(100,116,255);">LED3 OFF</button>
<button type="button" onclick="sendData(40)" style="background: rgb(100,116,255);">LED4 OFF</button><br><br>
State of [LED1, LED2,LED3,LED4] is >> <span
id="LEDState">NA</span><br></div><div><br>
(The challenge didn't tell me to do it.)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) {
```

```
load:0x3fff0018,len:4
load:0x3fff001c,len:1044
load:0x40078000,len:8896
load:0x40080400,len:5816
entry 0x400806ac


Connect to BOOK
.
Connected BOOK
IP address: 192.168.1.149
HTTP server started
11
21
31
41
```

[✓] Autoscroll [ ] Show timestamp — Carriage return — 115200 baud — Clear output

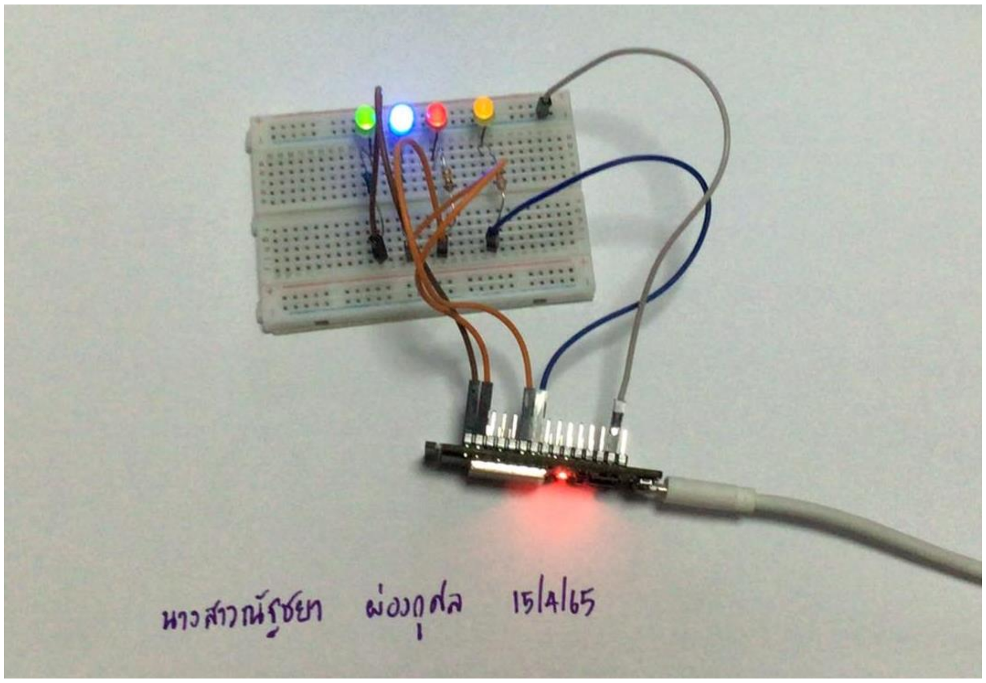


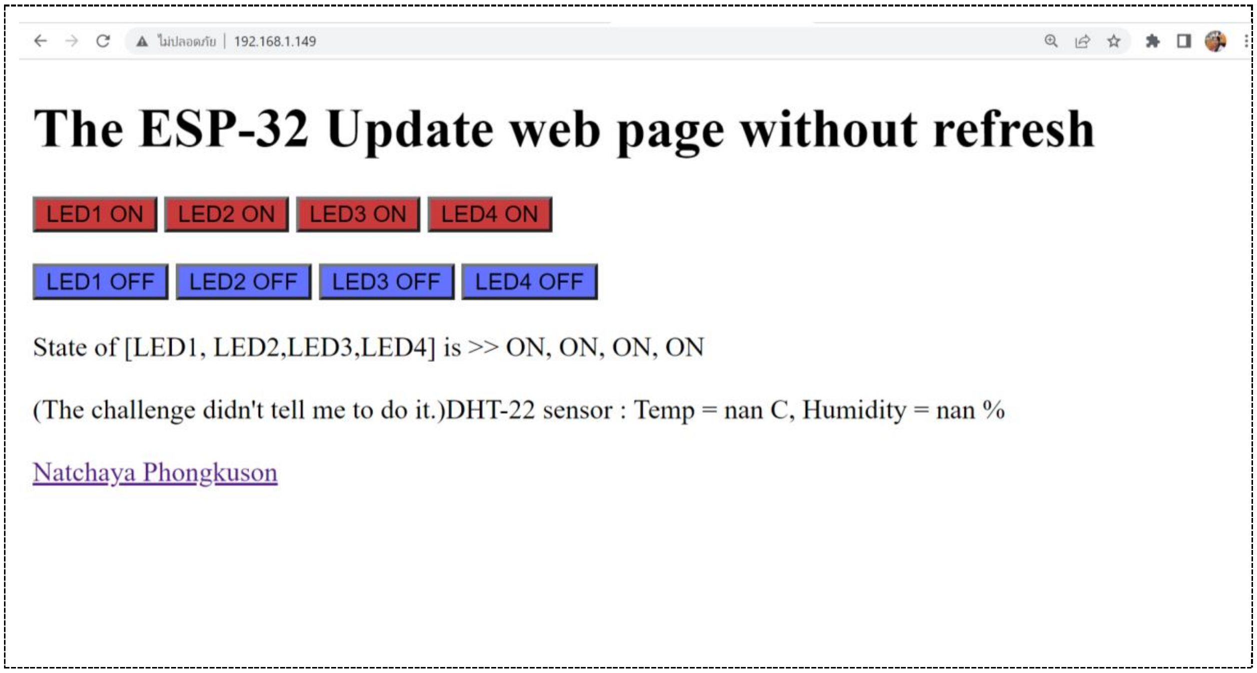
The ESP-32 Update web page without refresh

State of [LED1, LED2,LED3,LED4] is >> ON, ON, ON, ON

(The challenge didn't tell me to do it.)DHT-22 sensor : Temp = nan C, Humidity = nan %

Natchaya Phongkuson





The ESP-32 Update web page without refresh

State of [LED1, LED2,LED3,LED4] is >> ON, ON, ON, ON

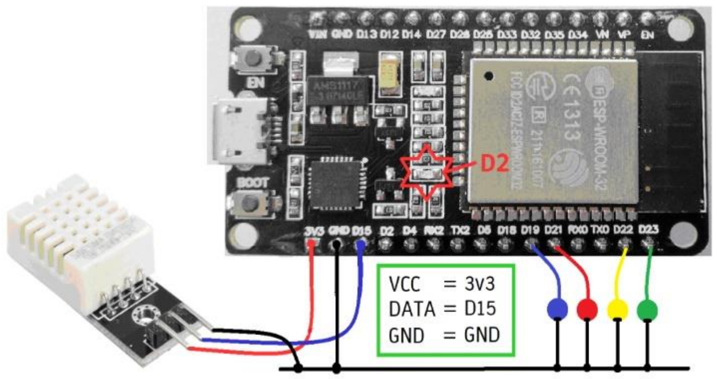
(The challenge didn't tell me to do it.)DHT-22 sensor : Temp = nan C, Humidity = nan %

Natchaya Phongkuson

Quiz_203 – Publish

- อ่านค่า DHT-22 แล้วส่งไปยัง MQTT Broker ทุกๆ 5 วินาที
- ควบคุมการแสดงผลให้ 4 LED แสดงผลตามข้อกำหนดดังนี้

✱○○○(Blink)	หากการอ่านค่าแล้วเป็น null, หรือไม่มีเซ็นเซอร์
●○○○	ช่วงของอุณหภูมิ (-∞, 24)
●●○○	ช่วงของอุณหภูมิ [24,26)
●●●○	ช่วงของอุณหภูมิ [26,28)
●●●●	ช่วงของอุณหภูมิ [28,30)
✱✱✱✱(Blink)	ช่วงของอุณหภูมิ [30,∞)

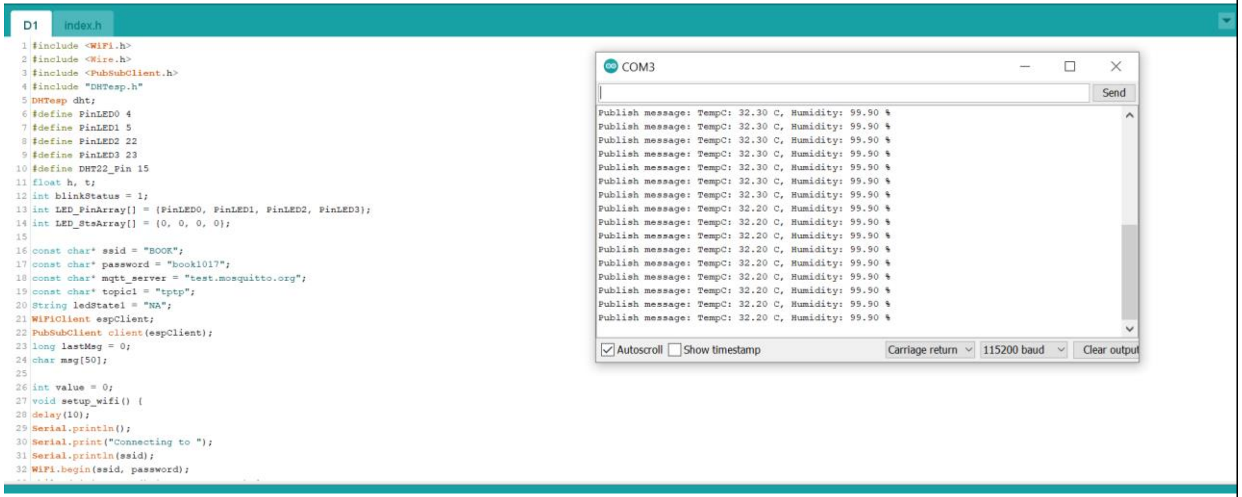


```
#include <WiFi.h>
#include <Wire.h>
#include <PubSubClient.h>
#include "DHTesp.h"
DHTesp dht;
#define PinLED0 4
#define PinLED1 5
#define PinLED2 22
#define PinLED3 23
#define DHT22_Pin 15
float h, t;
int blinkStatus = 1;
int LED_PinArray[] = {PinLED0, PinLED1, PinLED2, PinLED3};
int LED_StsArray[] = {0, 0, 0, 0};
```

```
const char* ssid = "BOOK";
const char* password = "book1017";
const char* mqtt_server = "test.mosquitto.org";
const char* topic1 = "tptp";
String ledState1 = "NA";
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());
}
```

```
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 LEDShowStatus(void) {
if (isnan(t)) {
blinkStatus = 1 - blinkStatus;
LED_StsArray[0] = 1;
LED_StsArray[1] = 0;
LED_StsArray[2] = 0;
LED_StsArray[3] = 0;
}
if (t < 27) {
blinkStatus = 1;
```

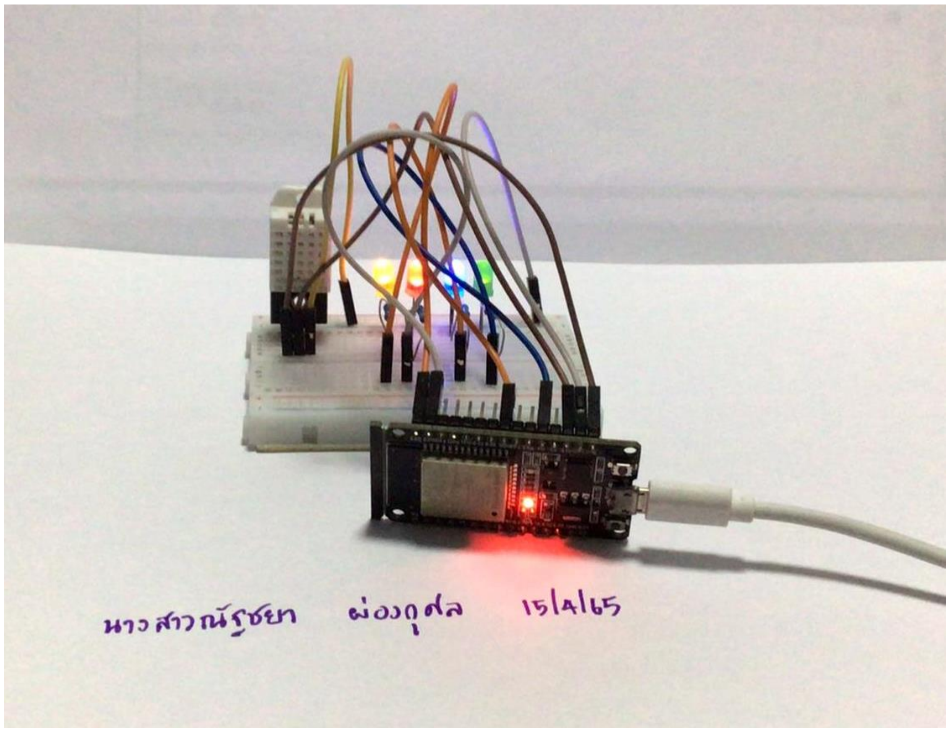
```
LED_StsArray[0] = 1;
LED_StsArray[1] = 0;
LED_StsArray[2] = 0;
LED_StsArray[3] = 0;
}
if (t >= 27) {
blinkStatus = 1 - blinkStatus;
LED_StsArray[0] = 1;
LED_StsArray[1] = 1;
LED_StsArray[2] = 1;
LED_StsArray[3] = 1;
}
LED_StsArray[1] = 1;
LED_StsArray[2] = 1;
LED_StsArray[3] = 1;

for (int i = 0; i < 4; i++)
digitalWrite(LED_PinArray[i], LED_StsArray[i] & blinkStatus);
}



void setup()
{ Serial.begin(115200);
setup_wifi();
//Wire.begin(22, 23);
client.setServer(mqtt_server, 1883);
dht.setup(DHT22_Pin, DHTesp::DHT22);
for(int i= 0;i<4;i++){
 pinMode(LED_PinArray[i], OUTPUT);
 }
}
void loop()
{
if (!client.connected()) reconnect();
client.loop();
long now = millis();
if (now - lastMsg > 5000)
{ lastMsg = now;
++value;
//float t = s.readTempC();
//float h = s.readHumidity();
delay(dht.getMinimumSamplingPeriod());
h = dht.getHumidity();
t = dht.getTemperature();

sprintf (msg, "TempC: %.2f C, Humidity: %.2f %%",t,h);
Serial.print("Publish message: ");
Serial.println(msg);
client.publish(topic1, msg);


}
LEDShowStatus(); delay(250);
LEDShowStatus(); delay(250);
LEDShowStatus(); delay(250);
LEDShowStatus(); delay(250);
LEDShowStatus(); delay(250);
LEDShowStatus(); delay(250);

}
```

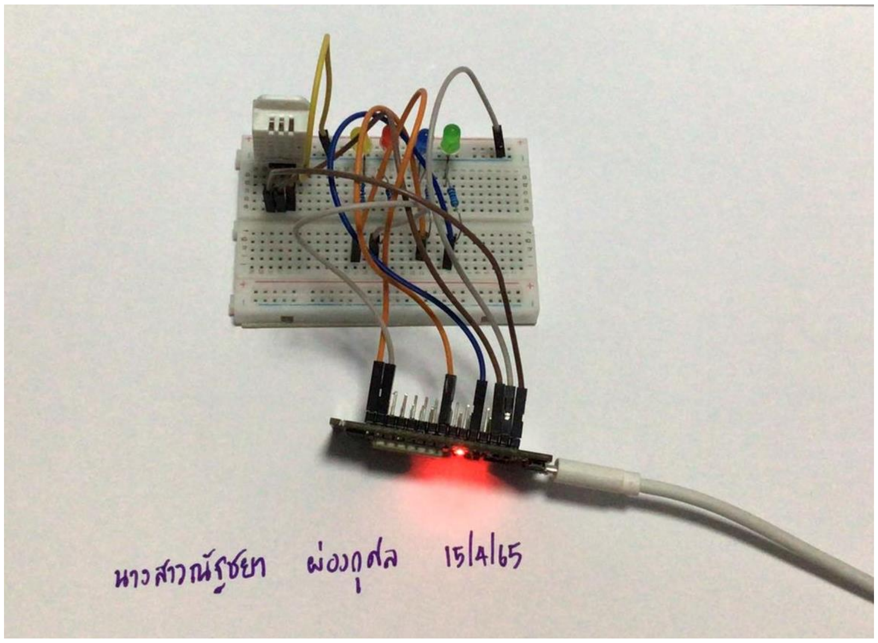


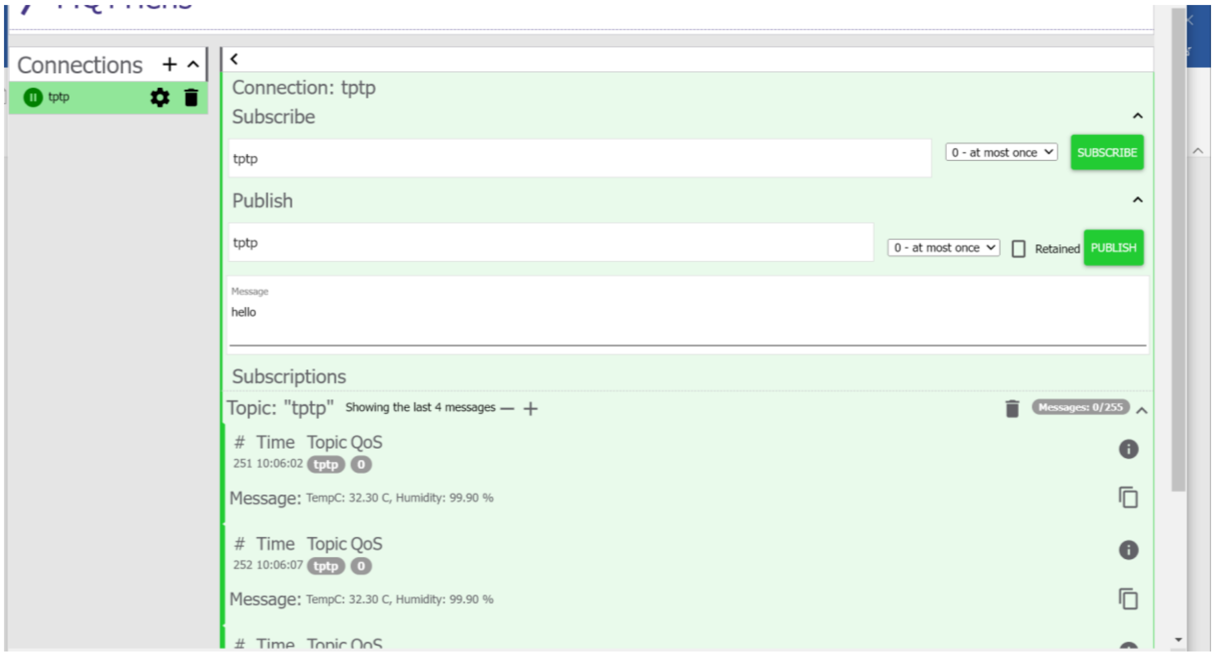
```
#include <WiFi.h>
#include <Wire.h>
#include <PubSubClient.h>
#include "DHTesp.h"
DHTesp dht;
#define PinLED0 4
#define PinLED1 5
#define PinLED2 22
#define PinLED3 23
#define DHT22_Pin 15
float h, t;
int blinkStatus = 1;
int LED_PinArray[] = {PinLED0, PinLED1, PinLED2, PinLED3};
int LED_StsArray[] = {0, 0, 0, 0};

const char* ssid = "BOOK";
const char* password = "book1017";
const char* mqtt_server = "test.mosquitto.org";
const char* topic1 = "tptp";
String ledState1 = "NA";
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);
```

```
Publish message: TempC: 32.30 C, Humidity: 99.90 %
Publish message: TempC: 32.30 C, Humidity: 99.90 %
Publish message: TempC: 32.30 C, Humidity: 99.90 %
Publish message: TempC: 32.30 C, Humidity: 99.90 %
Publish message: TempC: 32.30 C, Humidity: 99.90 %
Publish message: TempC: 32.30 C, Humidity: 99.90 %
Publish message: TempC: 32.30 C, Humidity: 99.90 %
Publish message: TempC: 32.20 C, Humidity: 99.90 %
Publish message: TempC: 32.20 C, Humidity: 99.90 %
Publish message: TempC: 32.20 C, Humidity: 99.90 %
Publish message: TempC: 32.20 C, Humidity: 99.90 %
Publish message: TempC: 32.20 C, Humidity: 99.90 %
Publish message: TempC: 32.20 C, Humidity: 99.90 %
Publish message: TempC: 32.20 C, Humidity: 99.90 %
Publish message: TempC: 32.20 C, Humidity: 99.90 %
Publish message: TempC: 32.20 C, Humidity: 99.90 %
```

☑ Autoscroll ☐ Show timestamp   Carriage return   115200 baud   Clear output







Connection: tptp

Subscribe

tptp | 0 - at most once | SUBSCRIBE

Publish

tptp | 0 - at most once | Retained | PUBLISH

Message
hello

Subscriptions

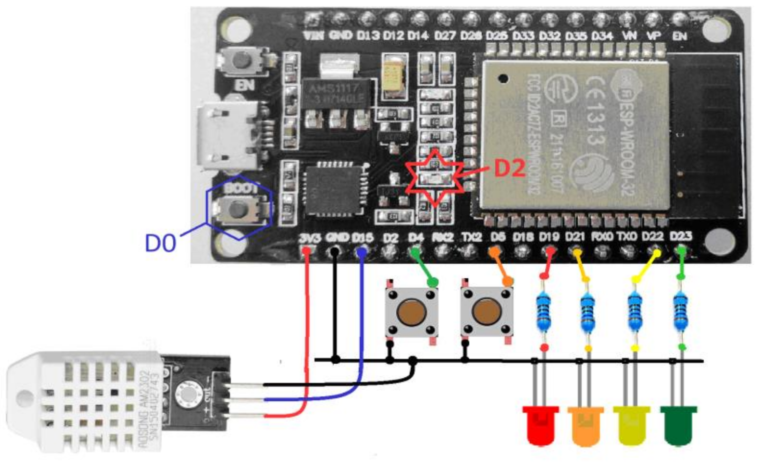
Topic: "tptp" Showing the last 4 messages

Messages: 0/255

```
# Time Topic QoS
251 10:06:02 tptp 0
Message: TempC: 32.30 C, Humidity: 99.90 %

# Time Topic QoS
252 10:06:07 tptp 0
Message: TempC: 32.30 C, Humidity: 99.90 %

# Time Topic QoS
```

Quiz_204 – Publish and Subscribe

- อ่านค่า DHT-22 แล้วส่งไปยัง MQTT Broker ทุกๆ 5 วินาที
- ควบคุมการปิดเปิด 4 LED
- รับค่าสวิตซ์กำหนด SW1 แจ้ง Overheat Alarm, SW2 แจ้ง Intruders Alarm

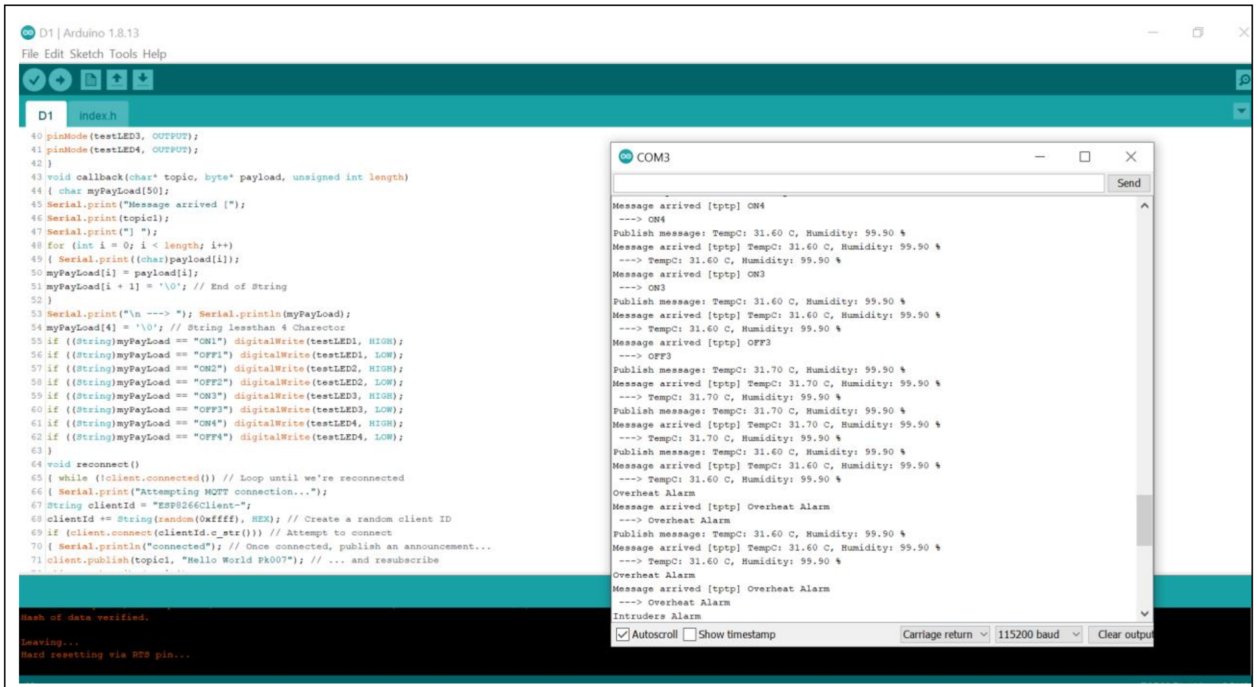


```
#include <WiFi.h>
#include <Wire.h>
#include <PubSubClient.h>
#include "DHTesp.h"
DHTesp dht;
#define testLED1 4
#define testLED2 5
#define testLED3 22
#define testLED4 23
#define DHT22_Pin 15

const char* ssid = "BOOK";
const char* password = "book1017";
const char* mqtt_server = "test.mosquitto.org";
const char* topic1 = "tptp";
String ledState1 = "NA";
```

```
int pushButton1 = 19;
int pushButton2 = 21;
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;
```

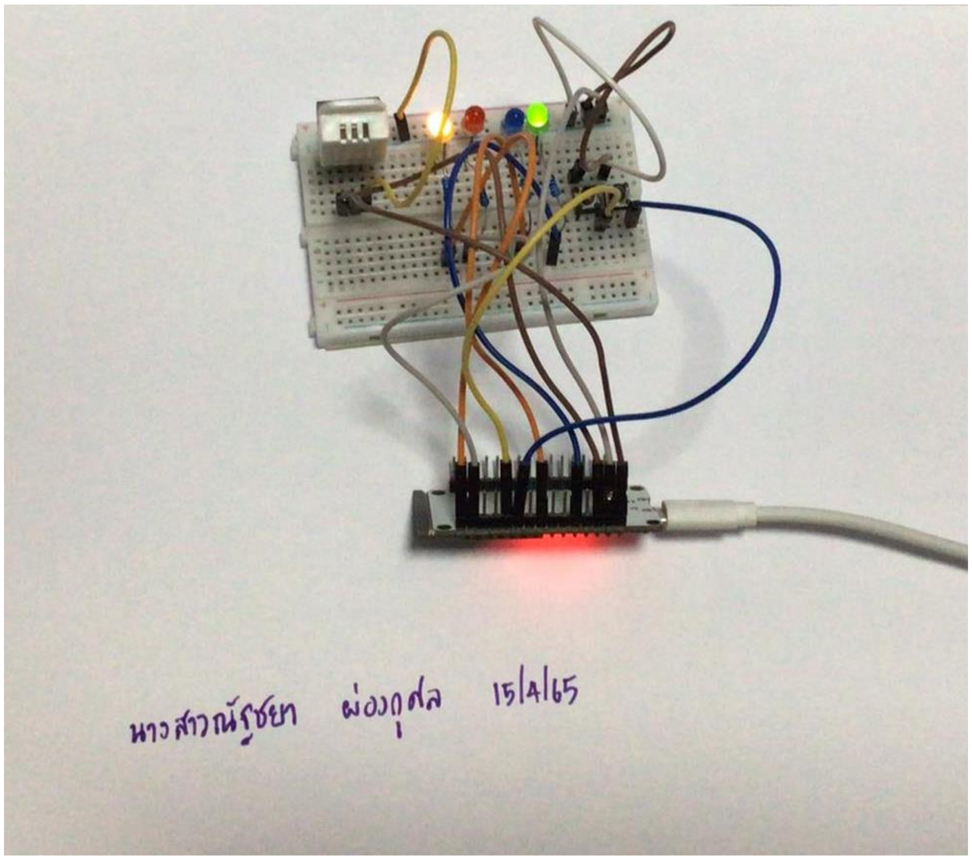
```
++value;
float h = dht.getHumidity();
float t = dht.getTemperature();
sprintf (msg, "TempC: %.2f C, Humidity: %.2f %%",t,h);
Serial.print("Publish message: ");
Serial.println(msg);
client.publish(topic1, msg);
}
if (digitalRead(pushButton1) == 0) {
sprintf (msg, "Overheat Alarm");
Serial.println(msg);
client.publish(topic1, msg);
delay(500);
}
if (digitalRead(pushButton2) == 0) {
sprintf (msg, "Intruders Alarm");
Serial.println(msg);
client.publish(topic1, msg);
delay(500);
}
}
```

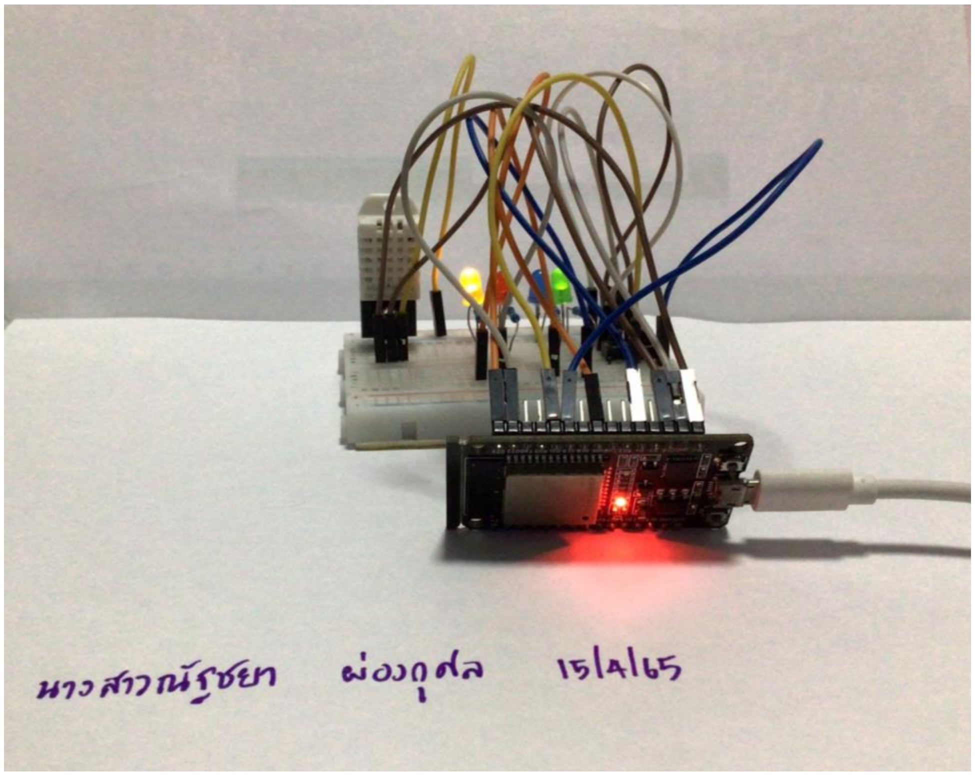


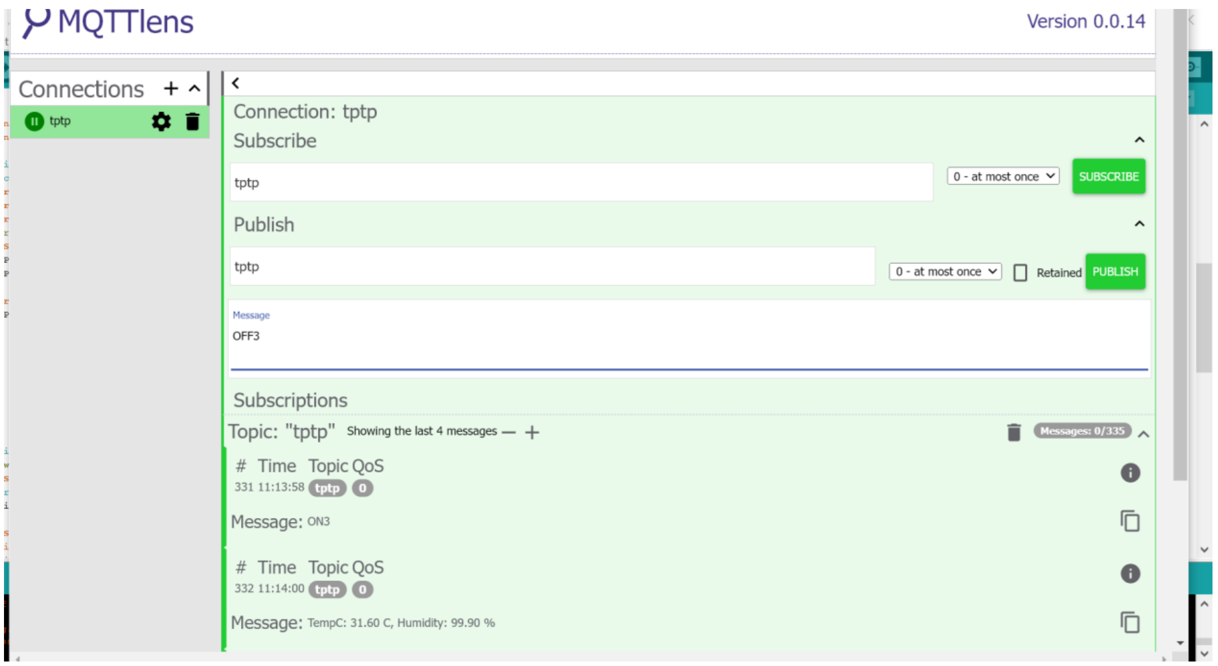
```
pinMode(testLED3, OUTPUT);
pinMode(testLED4, OUTPUT);
}
void callback(char* topic, byte* payload, unsigned int length)
{ char myPayLoad[50];
Serial.print("Message arrived [");
Serial.print(topic1);
Serial.print("] ");
for (int i = 0; i < length; i++)
{ Serial.print((char)payload[i]);
myPayLoad[i] = 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
```

```
Hash of data verified.

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

```
Message arrived [tptp] ON4
 ---> ON4
Publish message: TempC: 31.60 C, Humidity: 99.90 %
Message arrived [tptp] TempC: 31.60 C, Humidity: 99.90 %
 ---> TempC: 31.60 C, Humidity: 99.90 %
Message arrived [tptp] ON3
 ---> ON3
Publish message: TempC: 31.60 C, Humidity: 99.90 %
Message arrived [tptp] TempC: 31.60 C, Humidity: 99.90 %
 ---> TempC: 31.60 C, Humidity: 99.90 %
Message arrived [tptp] OFF3
 ---> OFF3
Publish message: TempC: 31.70 C, Humidity: 99.90 %
Message arrived [tptp] TempC: 31.70 C, Humidity: 99.90 %
 ---> TempC: 31.70 C, Humidity: 99.90 %
Publish message: TempC: 31.70 C, Humidity: 99.90 %
Message arrived [tptp] TempC: 31.70 C, Humidity: 99.90 %
 ---> TempC: 31.70 C, Humidity: 99.90 %
Publish message: TempC: 31.60 C, Humidity: 99.90 %
Message arrived [tptp] TempC: 31.60 C, Humidity: 99.90 %
 ---> TempC: 31.60 C, Humidity: 99.90 %
Overheat Alarm
Message arrived [tptp] Overheat Alarm
 ---> Overheat Alarm
Publish message: TempC: 31.60 C, Humidity: 99.90 %
Message arrived [tptp] TempC: 31.60 C, Humidity: 99.90 %
 ---> TempC: 31.60 C, Humidity: 99.90 %
Overheat Alarm
Message arrived [tptp] Overheat Alarm
 ---> Overheat Alarm
Intruders Alarm
```







Connection: tptp

Subscribe

tptp | 0 - at most once | SUBSCRIBE

Publish

tptp | 0 - at most once | Retained | PUBLISH

Message
OFF3

Subscriptions

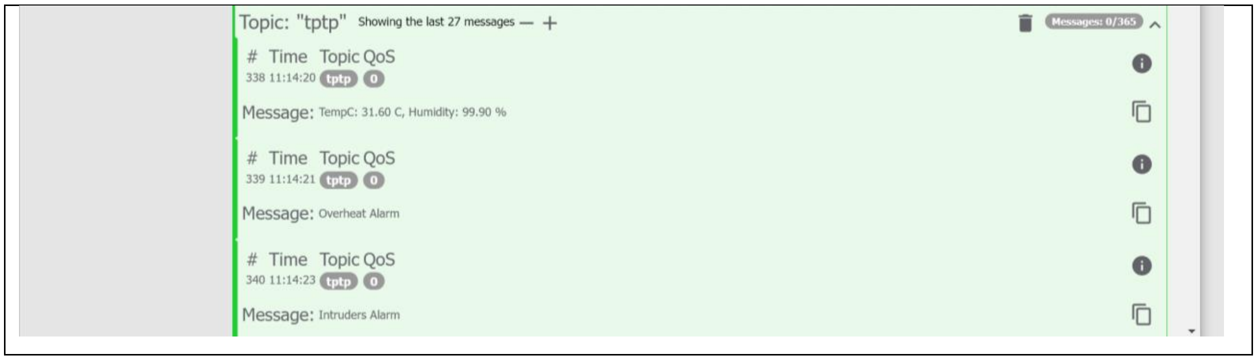
Topic: "tptp" Showing the last 4 messages — + Messages: 0/335

#	Time	Topic	QoS
331	11:13:58	tptp	0

Message: ON3

#	Time	Topic	QoS
332	11:14:00	tptp	0

Message: TempC: 31.60 C, Humidity: 99.90 %


Topic: "tptp" Showing the last 27 messages — +
Messages: 0/365

```
# Time Topic QoS
338 11:14:20 tptp 0
Message: TempC: 31.60 C, Humidity: 99.90 %

# Time Topic QoS
339 11:14:21 tptp 0
Message: Overheat Alarm

# Time Topic QoS
340 11:14:23 tptp 0
Message: Intruders Alarm
```