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คู่กับ
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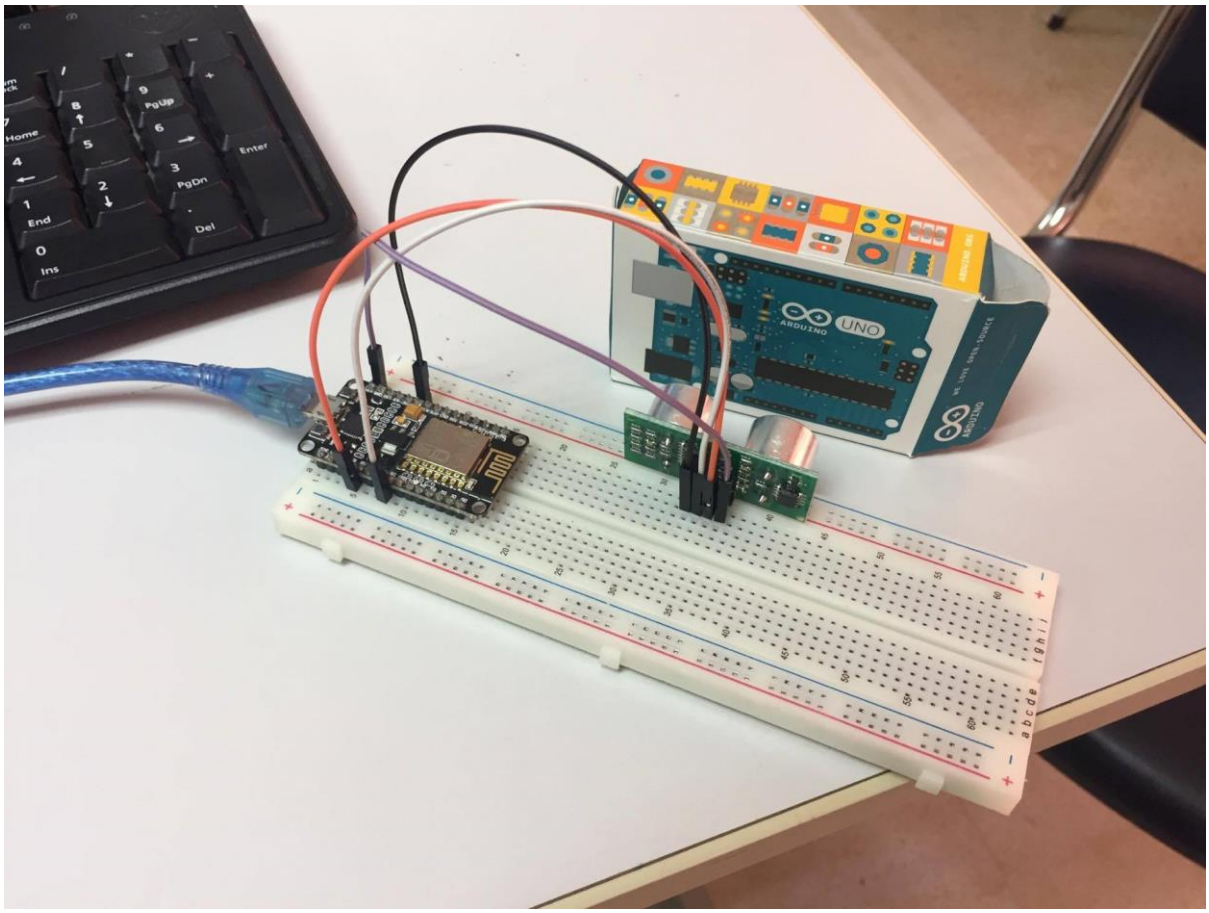
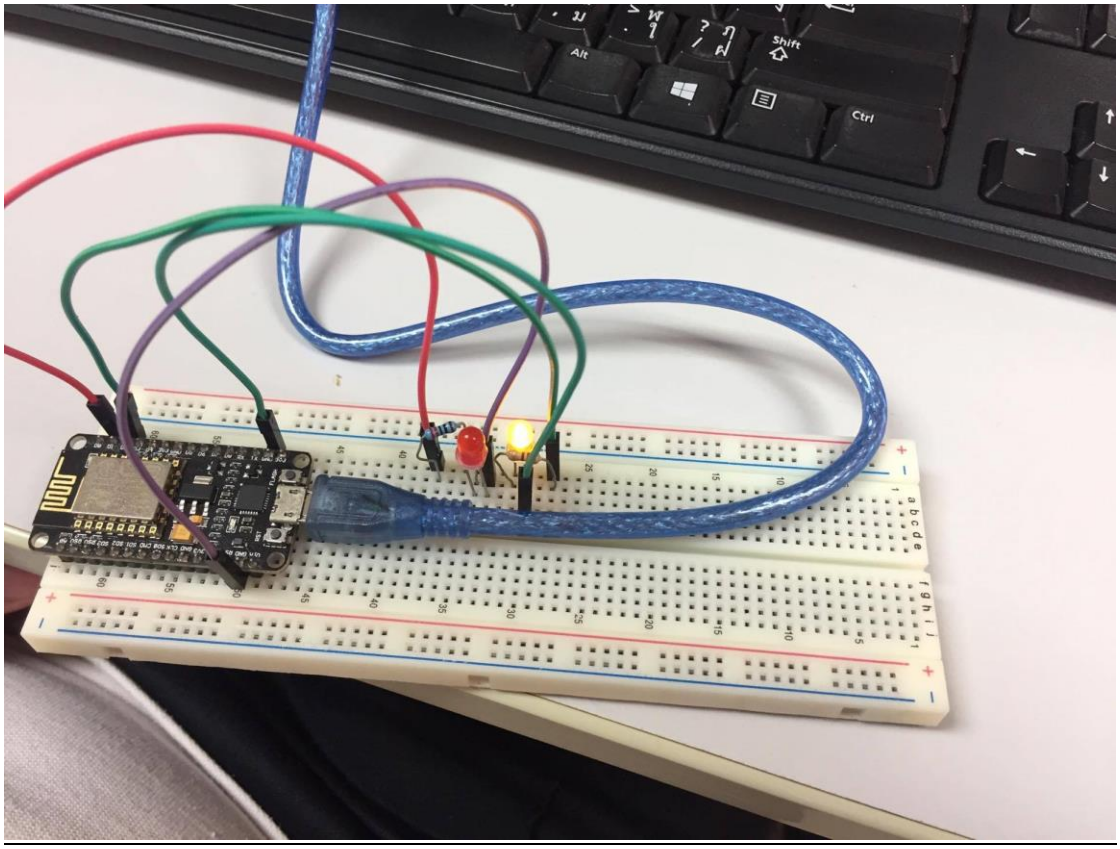
<u>อธิบายหลักการทำงาน</u>

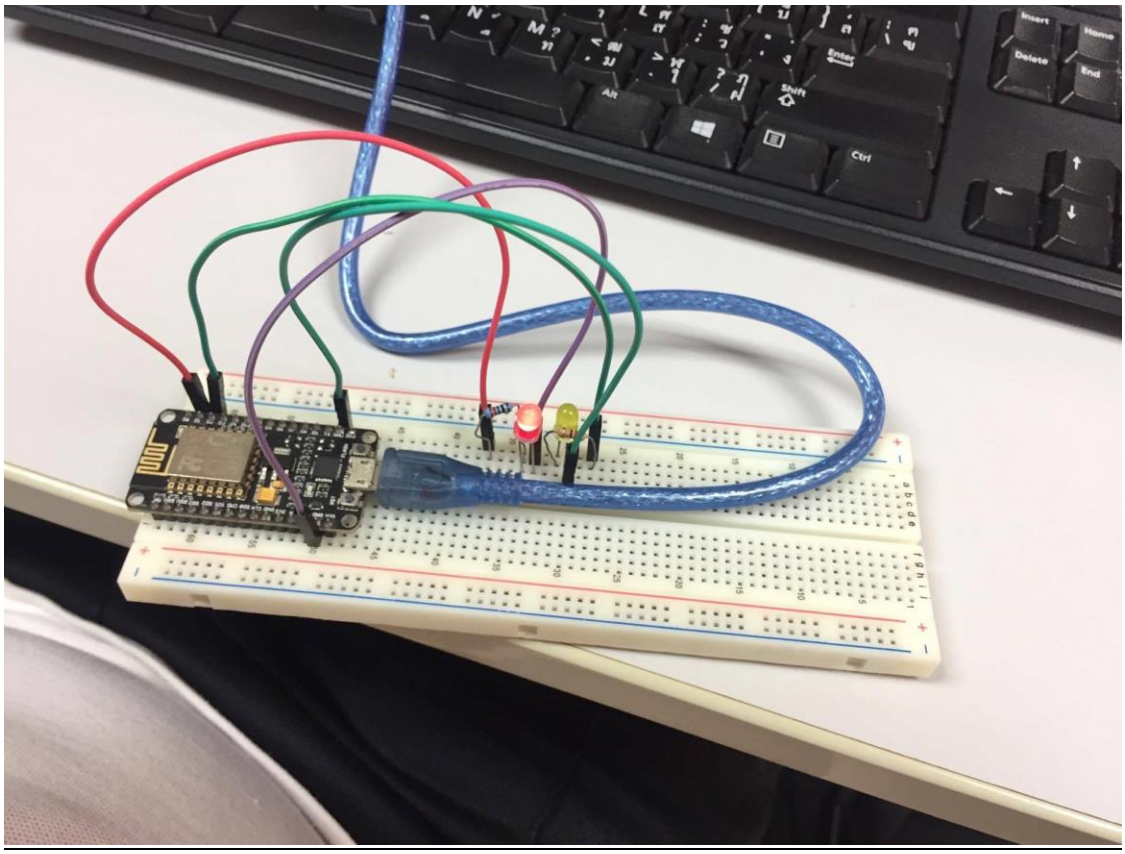
ข้อมูลการวัดระยะของ sensor ultrasonic จะถูกส่งไปที่ CloudMQTT Cloud Service เมื่อข้อมูลถูกส่งไปแล้ว ฝั่งที่รับข้อมูลก็ต้องนำ User Password Port ให้ตรงกับผู้ส่ง เมื่อใส่เรียบร้อยแล้ว ข้อมูลก็จะปรากฏขึ้นมา

ภาพการต่อวงจรฝั่งส่ง



ภาพการต่อวงจรฝั่งรับ





Source Code ตัวส่ง

```
#include <ESP8266WiFi.h>

#include <PubSubClient.h>

const int pingPin = D8; //trig

int inPin = D5; //echo

const char* ssid = "itfitm";

const char* password = "";

const char* mqtt_server = "m14.cloudmqtt.com";


char msg[50];


WiFiClient espClient;

PubSubClient client(espClient);


void setup() {

  Serial.begin(115200);

  setup_wifi();
```

```
  client.setServer(mqtt_server, 15650); //port ใน mqtt
  client.setCallback(callback);

}

void setup_wifi() {

  delay(10);
  // We start by connecting to a WiFi network
  Serial.println();
  Serial.print("Connecting 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());
}

void callback(char* topic, byte* payload, unsigned int length)
{
  Serial.print("Message arrived [");
  Serial.print(topic);
  Serial.print("] ");
}

void reconnect() {
  // Loop until we're reconnected
```

```
  while (!client.connected()) {
    Serial.print("Attempting MQTT connection...");
    // Attempt to connect
    if (client.connect("ultrasonic", "gzouyfmb", "dKduRu5xFY-G"))
{ // topic,username,password
      Serial.println("connected");
      // Once connected, publish an announcement...
      client.publish("iot", "Start");
      // ... and resubscribe
      //client.subscribe("Node2");
      client.publish("/checkDistance", "Hi");
    } else {
      Serial.print("failed, rc=");
      Serial.print(client.state());
      Serial.println(" try again in 5 seconds");
      // Wait 5 seconds before retrying
      delay(5000);
```

```
    }
  }
}

void loop() {
  if (!client.connected()) {
    reconnect();
  }
  client.loop();

  char so[50];
  long duration, cm;

  pinMode(pingPin, OUTPUT);

  digitalWrite(pingPin, LOW);
```

```
delayMicroseconds(2);

digitalWrite(pingPin, HIGH);

delayMicroseconds(5);

digitalWrite(pingPin, LOW);

pinMode(inPin, INPUT);

duration = pulseIn(inPin, HIGH);


cm = microsecondsToCentimeters(duration);


Serial.print(cm);

Serial.print("cm");

Serial.println();

delay(100);


itoa(cm, so, 10);

snprintf (msg, 75, so);

client.publish("/checkDistance", msg);
```

```
  Serial.print("MSG:   ");
  Serial.println(msg);
  delay(1000);

}

long microsecondsToCentimeters(long microseconds)
{
  // The speed of sound is 340 m/s or 29 microseconds per centimeter.
  // The ping travels out and back, so to find the distance of the
  // object we take half of the distance travelled.
  return microseconds / 29 / 2;
}
```

Source Code ตัวรับ

```
#include <ESP8266WiFi.h>
#include <PubSubClient.h>
const char* ssid = "itfitm";
const char* password = "";

#define mqtt_server "m14.cloudmqtt.com"
#define mqtt_port 15650
#define mqtt_user "gzouyfmb"
#define mqtt_password "dKduRu5xFY-G"
float oldTemp = 0.0;
WiFiClient espClient;
PubSubClient client(espClient);
void setup() {
  pinMode(D1, OUTPUT);
  pinMode(D2, OUTPUT);
  Serial.begin(115200);
```

```
//digitalWrite(D1, HIGH);


delay(10);


Serial.println();
Serial.print("Connecting 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());



  client.setServer(mqtt_server, mqtt_port);
  client.setCallback(callback);
}

void loop() {
  if (!client.connected()) {
    Serial.print("Attempting MQTT connection...");
    if (client.connect("iotsub", mqtt_user, mqtt_password)) {
      Serial.println("connected");
      client.subscribe("/checkDistance");
    } else {
      Serial.print("failed, rc=");
      Serial.print(client.state());
```

```
      Serial.println(" try again in 5 seconds");
      delay(5000);
      return;
    }
  }
  client.loop();

}

void callback(char* topic, byte* payload, unsigned int length)
{
  //Serial.print("Message arrived [");
  //Serial.print(topic);
  String msg = "";
  String to = "";
  int i = 0;
  while (i < length) msg += (char)payload[i++];
```

```
//  Serial.println(msg);
  to = topic;
//  Serial.print(to);
  if (to == "/checkDistance") {
    Serial.println(msg);
    if (msg.toFloat() > 30) {
      digitalWrite(D2, HIGH);
      digitalWrite(D1, LOW);
    } else {
      digitalWrite(D1, HIGH);
      digitalWrite(D2, LOW);
    }
  }
}
```

ภาพ Cloud MQTT