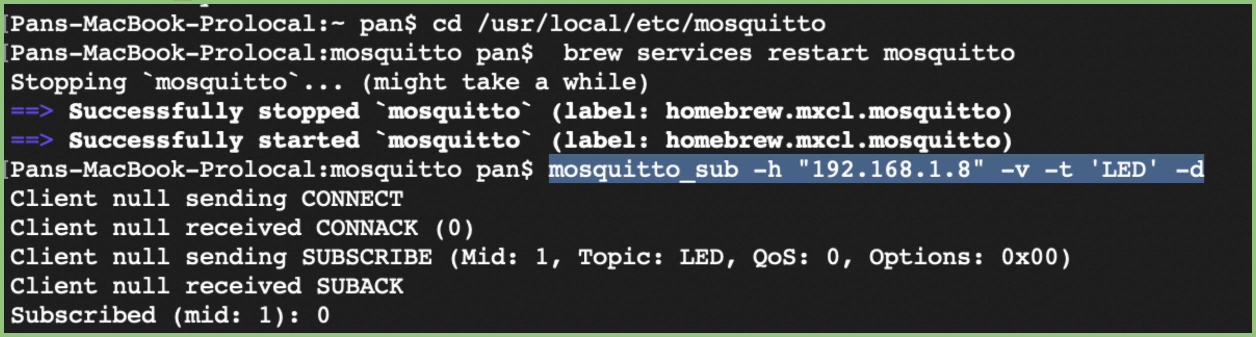
Final Project part1 (b) LED

Step 0, go to the director, start MQTT server

```
cd /usr/local/etc/mosquitto
brew services restart mosquitto
```

Step 1. create a MQTT-client subscriber the topic 'LED'

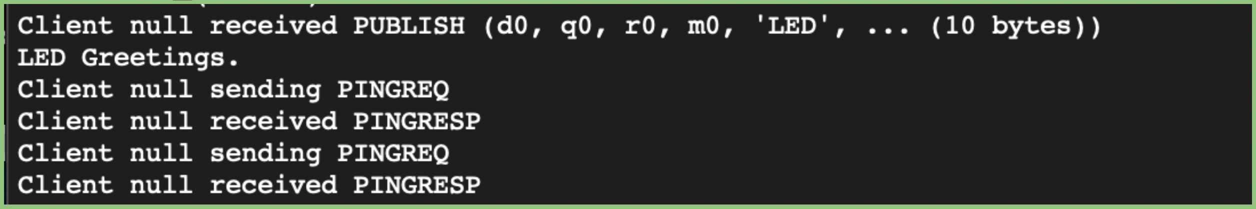
```
mosquitto_sub -h "192.168.1.8" -v -t 'LED' -d
```



```
Pans-MacBook-Prolocal:~ pan$ cd /usr/local/etc/mosquitto
Pans-MacBook-Prolocal:mosquitto pan$  brew services restart mosquitto
Stopping `mosquitto`... (might take a while)
==> Successfully stopped `mosquitto` (label: homebrew.mxcl.mosquitto)
==> Successfully started `mosquitto` (label: homebrew.mxcl.mosquitto)
Pans-MacBook-Prolocal:mosquitto pan$ mosquitto_sub -h "192.168.1.8" -v -t 'LED' -d
Client null sending CONNECT
Client null received CONNACK (0)
Client null sending SUBSCRIBE (Mid: 1, Topic: LED, QoS: 0, Options: 0x00)
Client null received SUBACK
Subscribed (mid: 1): 0
```

Step 2, create a MQTT-client publisher with the same topic to take user input

```
mosquitto_pub -h "192.168.1.8" -t 'LED' -m 'Greetings.'
```



```
Client null received PUBLISH (d0, q0, r0, m0, 'LED', ... (10 bytes))
LED Greetings.
Client null sending PINGREQ
Client null received PINGRESP
Client null sending PINGREQ
Client null received PINGRESP
```

Step 3, Arduino script source code,

```
#include <WiFi.h>
#include <PubSubClient.h>
#define LED 2


// variables for local WiFi
const char *ssid = "Be Cool Honey Bunny"; // WiFi name
const char *password = "7608144989";  // WiFi password

// variables for MQTT Broker(server)
```

```
const char *mqtt_broker = "192.168.1.8"; // WiFi local IP
address
const char *topic = "LED";
const char *mqtt_username = "emqx";
const char *mqtt_password = "public";
const int mqtt_port = 1883;


WiFiClient espClient;
PubSubClient client(espClient);


void setup() {

  // 1. Set software serial baud to 115200;
  Serial.begin(115200);

  pinMode(LED, OUTPUT);

  // 2. esp is connecting to local WiFi network
  WiFi.begin(ssid, password);

  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.println("Connecting to WiFi..");
  }

  Serial.println("Connected to the WiFi network");


  // 3. make esp32 to send / receive message via MQTT broker

  // 3a. connecting to a mqtt broker
  client.setServer(mqtt_broker, mqtt_port);

  // 4. message send back to esp32 (output in serial monitar
under same baud)
  client.setCallback(callback);

  // 3b
  while (!client.connected()) {

    String client_id = "[esp32-client]";

    client_id += String(WiFi.macAddress());
    Serial.printf("The client: %s connects to the public mqtt
broker.\n", client_id.c_str());

    // esp connects to MQTT broker succeed
    if (client.connect(client_id.c_str(), mqtt_username,
mqtt_password)) {
      Serial.println("Public emqx mqtt broker connected.");
    }

    // failed
    else {
      Serial.print("failed with state ");
      Serial.print(client.state());
      delay(2000);
    }
  }

  // 5. publish message and subscribe the same topic to receive
message from MQTT server
  client.publish(topic, "Greetings from ESP32 board.");
  client.subscribe(topic);
}

// 4. what you will see in series monitar
void callback(char *topic, byte *payload, unsigned int length) {

  Serial.print("Message arrived in topic: ");
  Serial.println(topic);

  String s = "";
  for (int i = 0; i < length; i++) {
    // Serial.print((char) payload[i]);
    s += (char) payload[i];
  }

  if (s == "1") {
    digitalWrite(LED, HIGH);  // high volt means lights on
    delay(1000);
    Serial.println("Press 1 --> LED on.");
  }

  else if (s == "2") {
    digitalWrite(LED, LOW);  // lowvolt means lights off
    delay(1000);
    Serial.println("Press 2 --> LED off.");
  }
  else {
    delay(2000);
  }

  Serial.println();
  Serial.println("-----------------------");
}

// 5. run the loop
void loop() {
  client.loop();
}
```

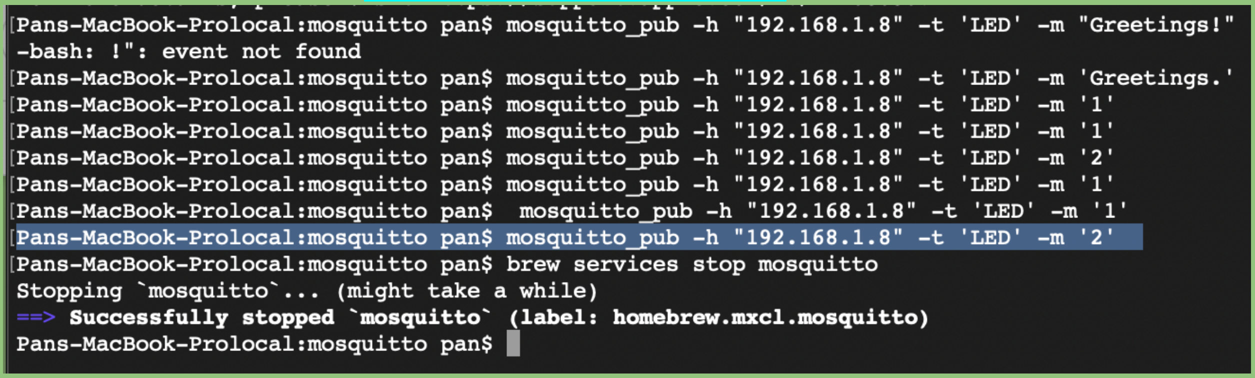
Step 4, turn on the LED

```
mosquitto_pub -h "192.168.1.8" -t 'LED' -m '1'
```

Step 5, turn off the LED

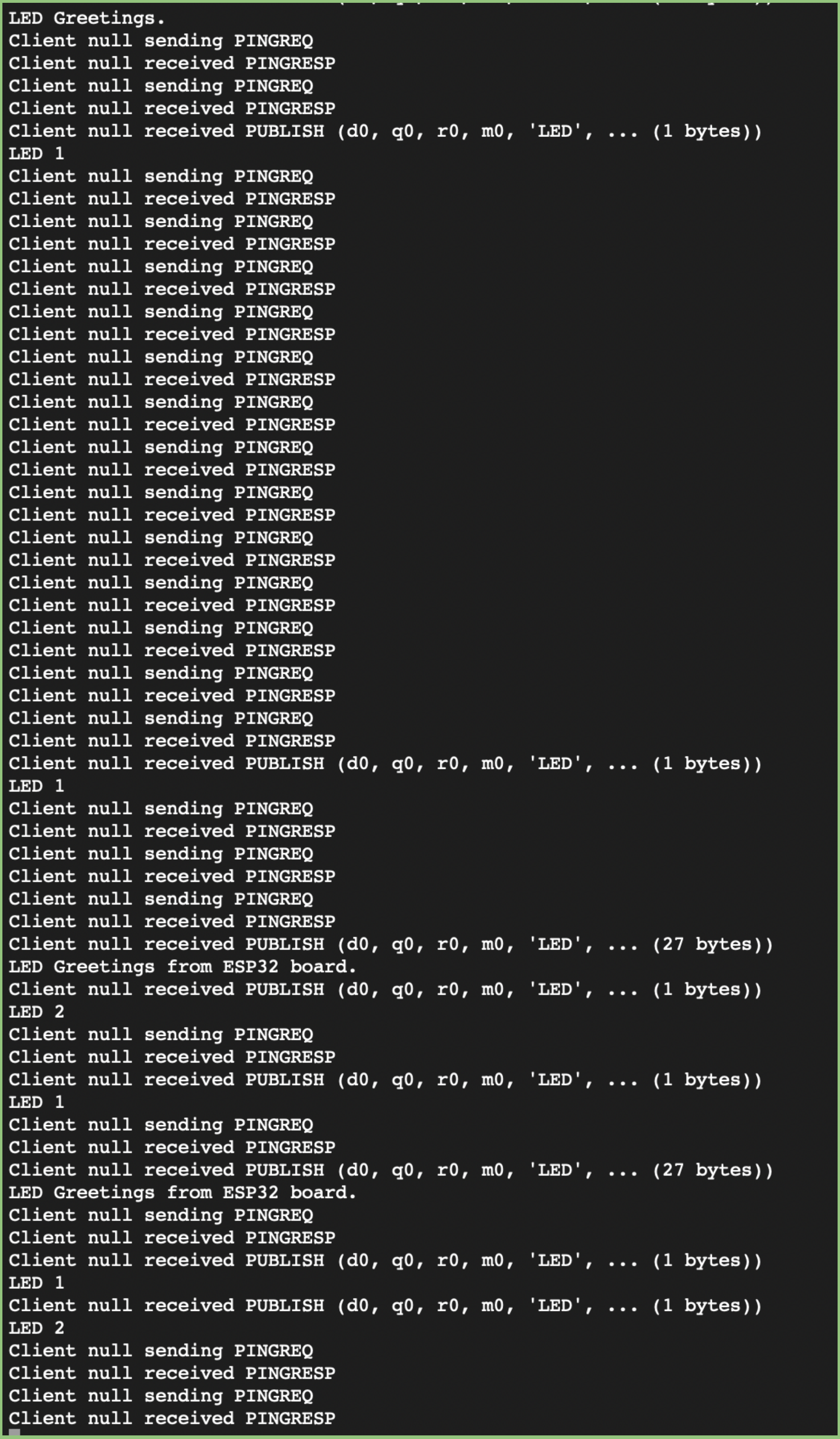
```
Pans-MacBook-Prolocal:mosquitto pan$ mosquitto_pub -h "192.168.1.8" -t 'LED' -m '2'
```

Checking output on MQTT-client publisher



```
Pans-MacBook-Prolocal:mosquitto pan$ mosquitto_pub -h "192.168.1.8" -t 'LED' -m "Greetings!"
-bash: !": event not found
Pans-MacBook-Prolocal:mosquitto pan$ mosquitto_pub -h "192.168.1.8" -t 'LED' -m 'Greetings.'
Pans-MacBook-Prolocal:mosquitto pan$ mosquitto_pub -h "192.168.1.8" -t 'LED' -m '1'
Pans-MacBook-Prolocal:mosquitto pan$ mosquitto_pub -h "192.168.1.8" -t 'LED' -m '1'
Pans-MacBook-Prolocal:mosquitto pan$ mosquitto_pub -h "192.168.1.8" -t 'LED' -m '2'
Pans-MacBook-Prolocal:mosquitto pan$ mosquitto_pub -h "192.168.1.8" -t 'LED' -m '1'
Pans-MacBook-Prolocal:mosquitto pan$  mosquitto_pub -h "192.168.1.8" -t 'LED' -m '1'
Pans-MacBook-Prolocal:mosquitto pan$ mosquitto_pub -h "192.168.1.8" -t 'LED' -m '2'
Pans-MacBook-Prolocal:mosquitto pan$ brew services stop mosquitto
Stopping `mosquitto`... (might take a while)
==> Successfully stopped `mosquitto` (label: homebrew.mxcl.mosquitto)
Pans-MacBook-Prolocal:mosquitto pan$
```

Checking MQTT-client subscriber terminal:



```
LED Greetings.
Client null sending PINGREQ
Client null received PINGRESP
Client null sending PINGREQ
Client null received PINGRESP
Client null received PUBLISH (d0, q0, r0, m0, 'LED', ... (1 bytes))
LED 1
Client null sending PINGREQ
Client null received PINGRESP
Client null sending PINGREQ
Client null received PINGRESP
Client null sending PINGREQ
Client null received PINGRESP
Client null sending PINGREQ
Client null received PINGRESP
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Client null sending PINGREQ
Client null received PINGRESP
Client null sending PINGREQ
Client null received PINGRESP
Client null received PUBLISH (d0, q0, r0, m0, 'LED', ... (1 bytes))
LED 1
Client null sending PINGREQ
Client null received PINGRESP
Client null sending PINGREQ
Client null received PINGRESP
Client null sending PINGREQ
Client null received PINGRESP
Client null received PUBLISH (d0, q0, r0, m0, 'LED', ... (27 bytes))
LED Greetings from ESP32 board.
Client null received PUBLISH (d0, q0, r0, m0, 'LED', ... (1 bytes))
LED 2
Client null sending PINGREQ
Client null received PINGRESP
Client null received PUBLISH (d0, q0, r0, m0, 'LED', ... (1 bytes))
LED 1
Client null sending PINGREQ
Client null received PINGRESP
Client null received PUBLISH (d0, q0, r0, m0, 'LED', ... (27 bytes))
LED Greetings from ESP32 board.
Client null sending PINGREQ
Client null received PINGRESP
Client null received PUBLISH (d0, q0, r0, m0, 'LED', ... (1 bytes))
LED 1
Client null received PUBLISH (d0, q0, r0, m0, 'LED', ... (1 bytes))
LED 2
Client null sending PINGREQ
Client null received PINGRESP
Client null sending PINGREQ
Client null received PINGRESP
```
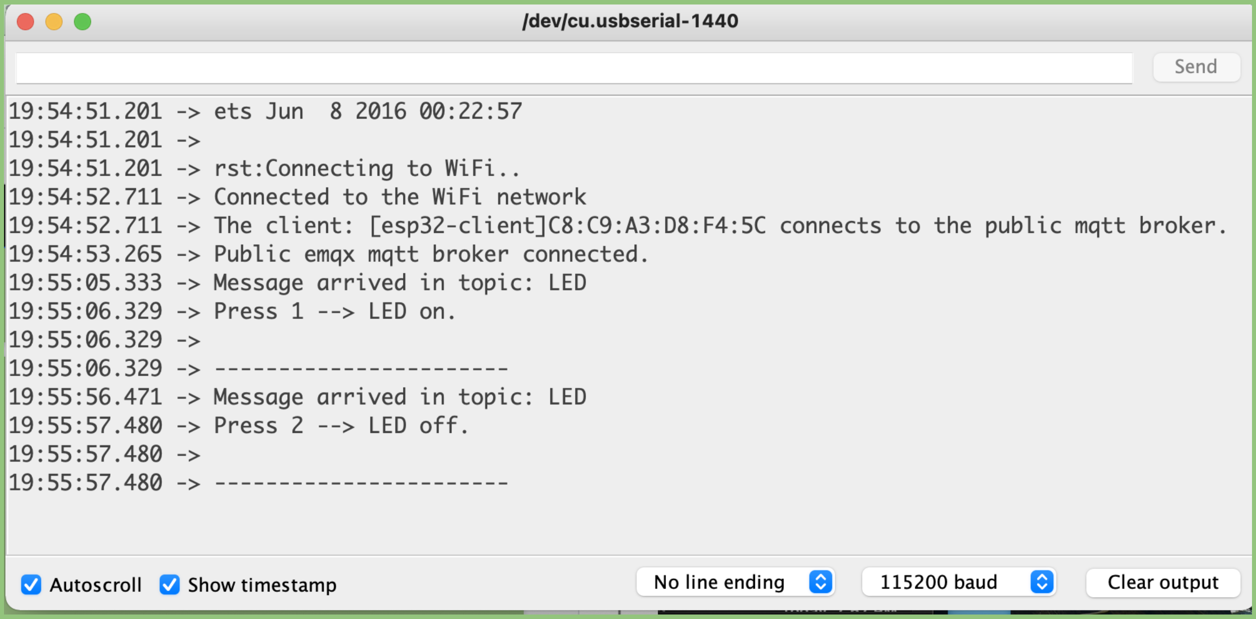

Checking Arduino Serial Monitor



```
19:54:51.201 -> ets Jun  8 2016 00:22:57
19:54:51.201 -> 
19:54:51.201 -> rst:Connecting to WiFi..
19:54:52.711 -> Connected to the WiFi network
19:54:52.711 -> The client: [esp32-client]C8:C9:A3:D8:F4:5C connects to the public mqtt broker.
19:54:53.265 -> Public emqx mqtt broker connected.
19:55:05.333 -> Message arrived in topic: LED
19:55:06.329 -> Press 1 --> LED on.
19:55:06.329 -> 
19:55:06.329 -> -----------------------
19:55:56.471 -> Message arrived in topic: LED
19:55:57.480 -> Press 2 --> LED off.
19:55:57.480 -> 
19:55:57.480 -> -----------------------
```

☑ Autoscroll ☑ Show timestamp — No line ending — 115200 baud — Clear output

meanwhile, the board LED is on and off according to the publisher#1

Finally, stop service on publisher terminal

brew services stop mosquitto