

MQTT LED simple proof of concept

#code

#MQTT

#iot

part of iot - internet of things

write up on this task

 [Back](#)

Tugas Mandiri: LED dan MQTT (INDIVIDU)

Due today at 11:59 PM

Points
No points

Instructions

Buatlah program LED Kelap-Kelip pada ESP32 menggunakan Arduino IDE (atau Micropython)

- Input: frekuensi base 10 Hz. Tombol yang apabila ditekan maka frekuensi bertambah 1.
- Kirimkan data [NIM kalian] : [Frekuensi LED] secara periodic ke MQTT server (publish-subscribe).
- Output: LED Kelap-Kelip dan data NIM-frekuensi.

Sertakan program dan Screenshot hasil pada laporan.
Deadline hari Selasa 12 Maret 2024 pukul 11:59.

Reference materials

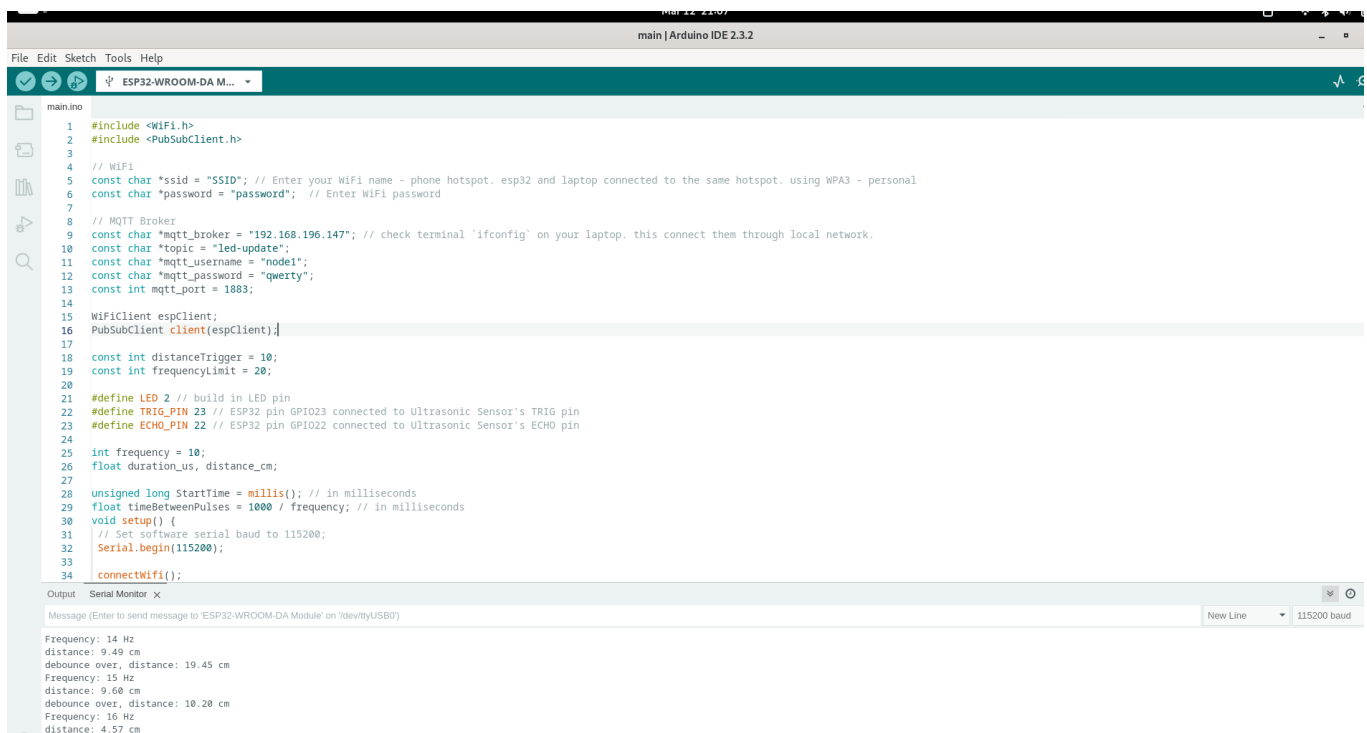
 Tugas Perorangan 1 2024.pdf ...

My work

 [Attach](#)  [New](#)

codes can be accessed [here](#).

screenshots



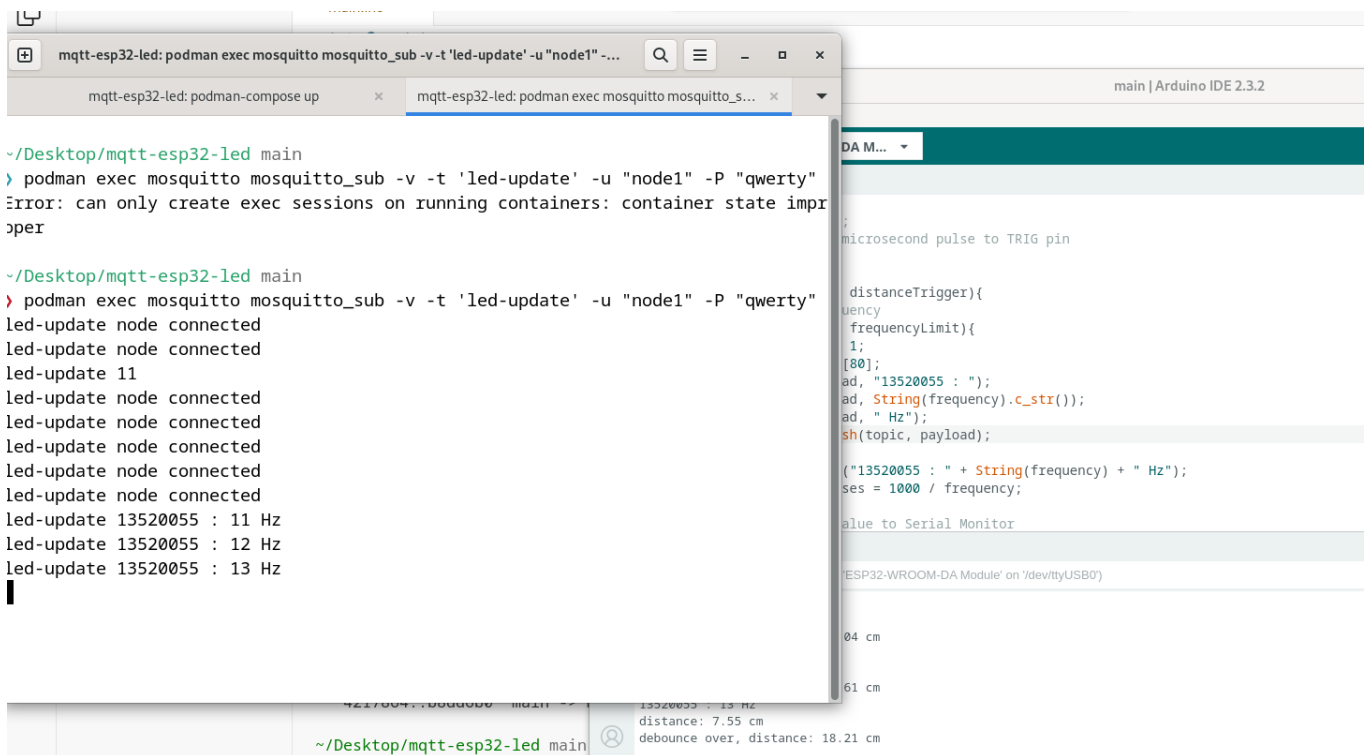
```
main.ino
1 #include <WiFi.h>
2 #include <PubSubClient.h>
3
4 // WiFi
5 const char *ssid = "SSID"; // Enter your WiFi name - phone hotspot. esp32 and laptop connected to the same hotspot. using WPA3 - personal
6 const char *password = "password"; // Enter WiFi password
7
8 // MQTT Broker
9 const char *mqtt_broker = "192.168.196.147"; // check terminal 'ifconfig' on your laptop. this connect them through local network.
10 const char *topic = "led-update";
11 const char *mqtt_username = "node1";
12 const char *mqtt_password = "qwerty";
13 const int mqtt_port = 1883;
14
15 WiFiClient espClient;
16 PubSubClient client(espClient);
17
18 const int distanceTrigger = 10;
19 const int frequencyLimit = 20;
20
21 #define LED 2 // build in LED pin
22 #define TRIG_PIN 23 // ESP32 pin GPIO23 connected to Ultrasonic Sensor's TRIG pin
23 #define ECHO_PIN 22 // ESP32 pin GPIO22 connected to Ultrasonic Sensor's ECHO pin
24
25 int frequency = 10;
26 float duration_us, distance_cm;
27
28 unsigned long StartTime = millis(); // in milliseconds
29 float timeBetweenPulses = 1000 / frequency; // in milliseconds
30 void setup() {
31 // Set software serial baud to 115200;
32 Serial.begin(115200);
33
34 connectWifi();
35
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```

Output Serial Monitor x

Message (Enter to send message to 'ESP32-WROOM-DA Module' on 'devttyUSB0')

Frequency: 14 Hz
distance: 9.49 cm
debounce over, distance: 19.45 cm
Frequency: 15 Hz
distance: 9.68 cm
debounce over, distance: 10.20 cm
Frequency: 16 Hz
distance: 4.57 cm

code on esp32



```
~/Desktop/mqtt-esp32-led main
> podman exec mosquitto mosquitto_sub -v -t 'led-update' -u "node1" -P "qwerty"
Error: can only create exec sessions on running containers: container state impr
oper

~/Desktop/mqtt-esp32-led main
> podman exec mosquitto mosquitto_sub -v -t 'led-update' -u "node1" -P "qwerty"
led-update node connected
led-update node connected
led-update 11
led-update node connected
led-update node connected
led-update node connected
led-update node connected
led-update node connected
led-update 13520055 : 11 Hz
led-update 13520055 : 12 Hz
led-update 13520055 : 13 Hz
```

mqtt-esp32-led: podman exec mosquitto mosquitto_sub -v -t 'led-update' -u "node1" -P "qwerty"

mqtt-esp32-led: podman-compose up

main | Arduino IDE 2.3.2

ESP32-WROOM-DA Module' on 'devttyUSB0')

04 cm

61 cm

13520055 : 13 Hz
distance: 7.55 cm
debounce over, distance: 18.21 cm

running code. subscriber on the left, publisher on the right triggered by esp32

there are **videos** inside the [github repository](#).

note: because I have no button component available, I used ultrasonic sensor. if the distance is close, I consider it as 'pressed'. I set the distance threshold to be 10 cm.

troubleshooting

trouble connecting to MQTT broker

keep hitting client state -2 when connecting to MQTT broker. tried multiple broker, from local device, container (using podman), hiveMQ, EMQX. then finally tried hitting public broker. and it works. then tried keeping the broker server empty, and got -2. there's not much documentation on what this state means. but based on the last result, I figure that it's because it can't find the host. I looked into many forums, checking different way to connecting to MQTT broker (TCP, TLS)

then I realize that they run on different device. I got used to running things on my laptop, where I can access stuff inside using localhost. I set the mqtt broker to be localhost all this time. solution: they need to be connected over local network. I used my phone hotspot, and connect esp32 and laptop to it. Then I check `ifconfig` for the IP address of my laptop. and it works.

podman chown permission denied

googling a bit, I realized I have similiar problem in the past. I checked into my past project and added this line to the `docker-compose.yml` file

```
security_opt:  
- label:disable
```

sources

- ultrasonic sensor setup
- debounce and LED frequency setup
- MQTT on container
- ESP32 LED blink
- testing MQTT basic publish subscribe