REPORT LAB

EMBEDDED SYSTEM - CO3054

Group: **CC02**

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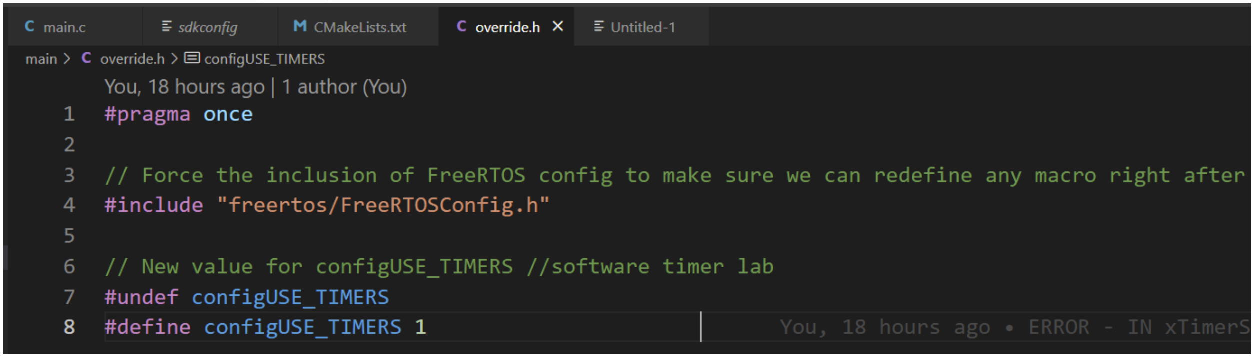
Contents

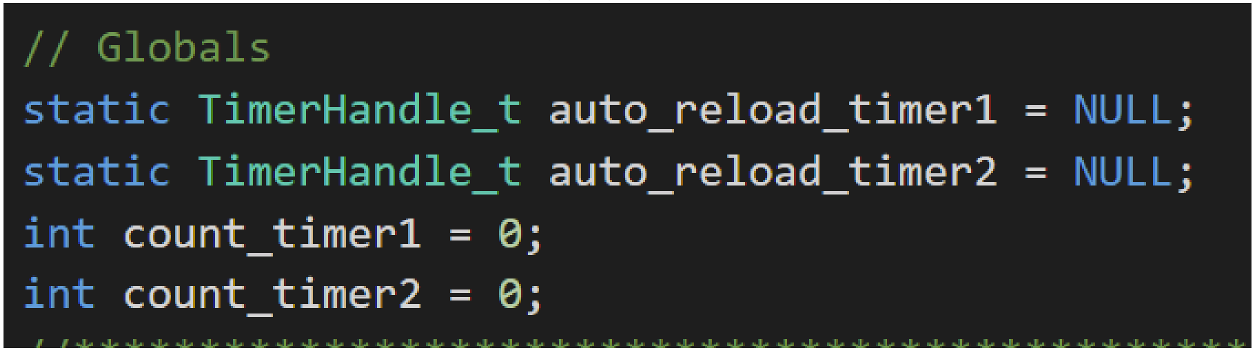
I. FREERTOS SOFTWARE TIMER

1. After create new Project with Template. I config “configUSE_TIMERS” in FreeRTOSConfig.h by new file override.h


main.c
sdkconfig
CMakeLists.txt
override.h
Untitled-1
main > override.h > configUSE_TIMERS
You, 18 hours ago | 1 author (You)
You, 18 hours ago • ERROR - IN xTimerS

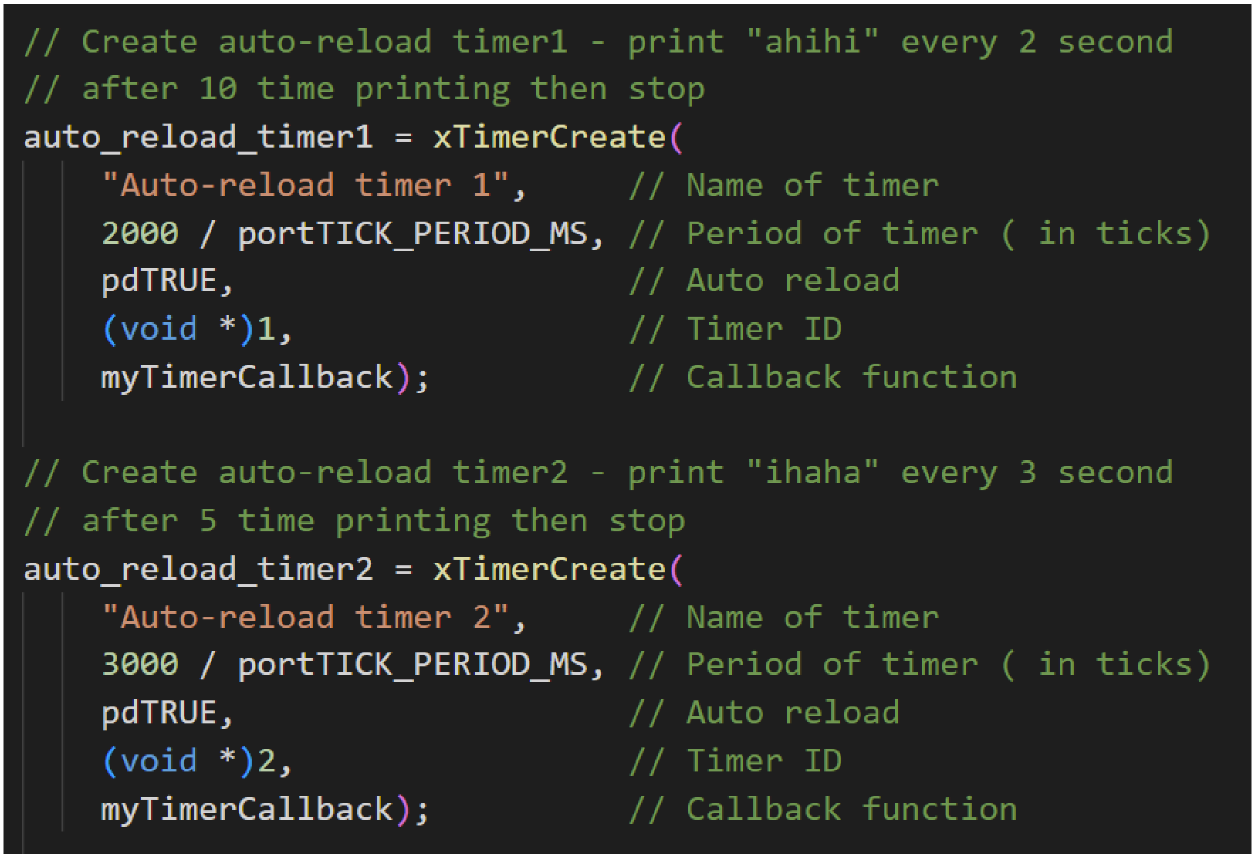
```c
#pragma once

// Force the inclusion of FreeRTOS config to make sure we can redefine any macro right after
#include "freertos/FreeRTOSConfig.h"

// New value for configUSE_TIMERS //software timer lab
#undef configUSE_TIMERS
#define configUSE_TIMERS 1
```

2. Initialize Global variables: 2 timer by NULL and counter by 0.



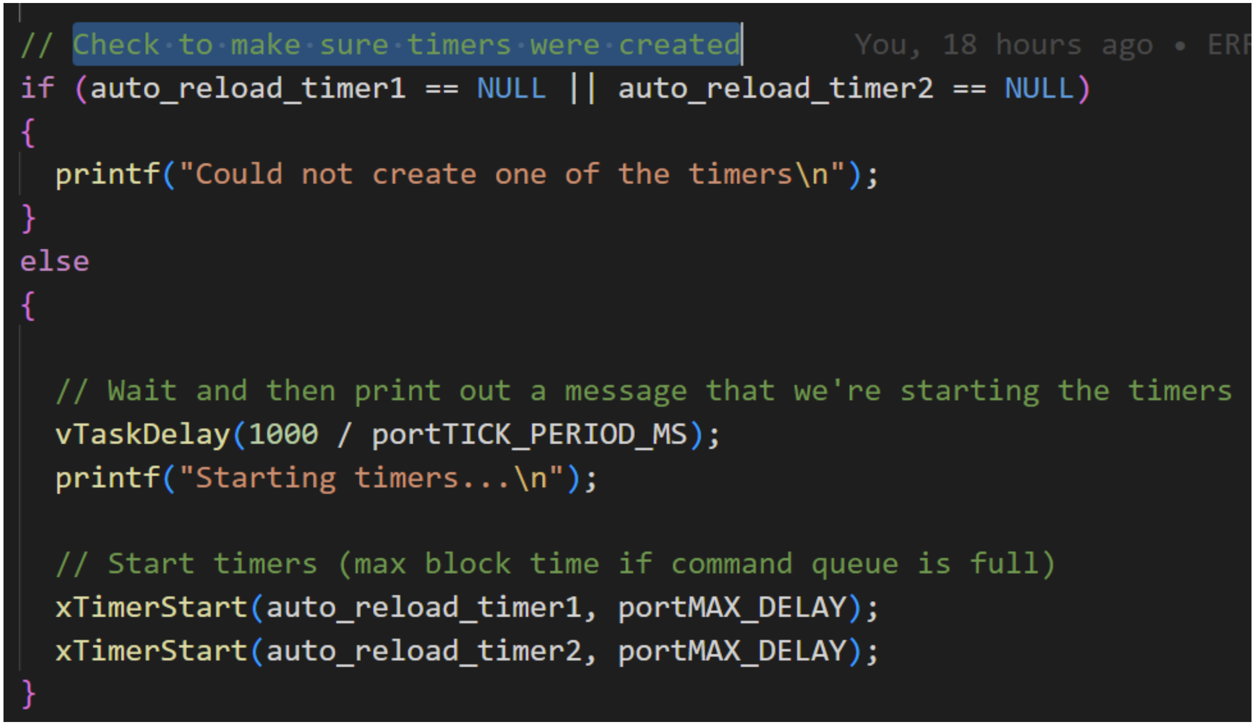
```c
// Globals
static TimerHandle_t auto_reload_timer1 = NULL;
static TimerHandle_t auto_reload_timer2 = NULL;
int count_timer1 = 0;
int count_timer2 = 0;
```

3. In app_main(), I use **xTimerCreate** for 2 timer **auto_loader_timer1** and **auto_loader_timer2.**



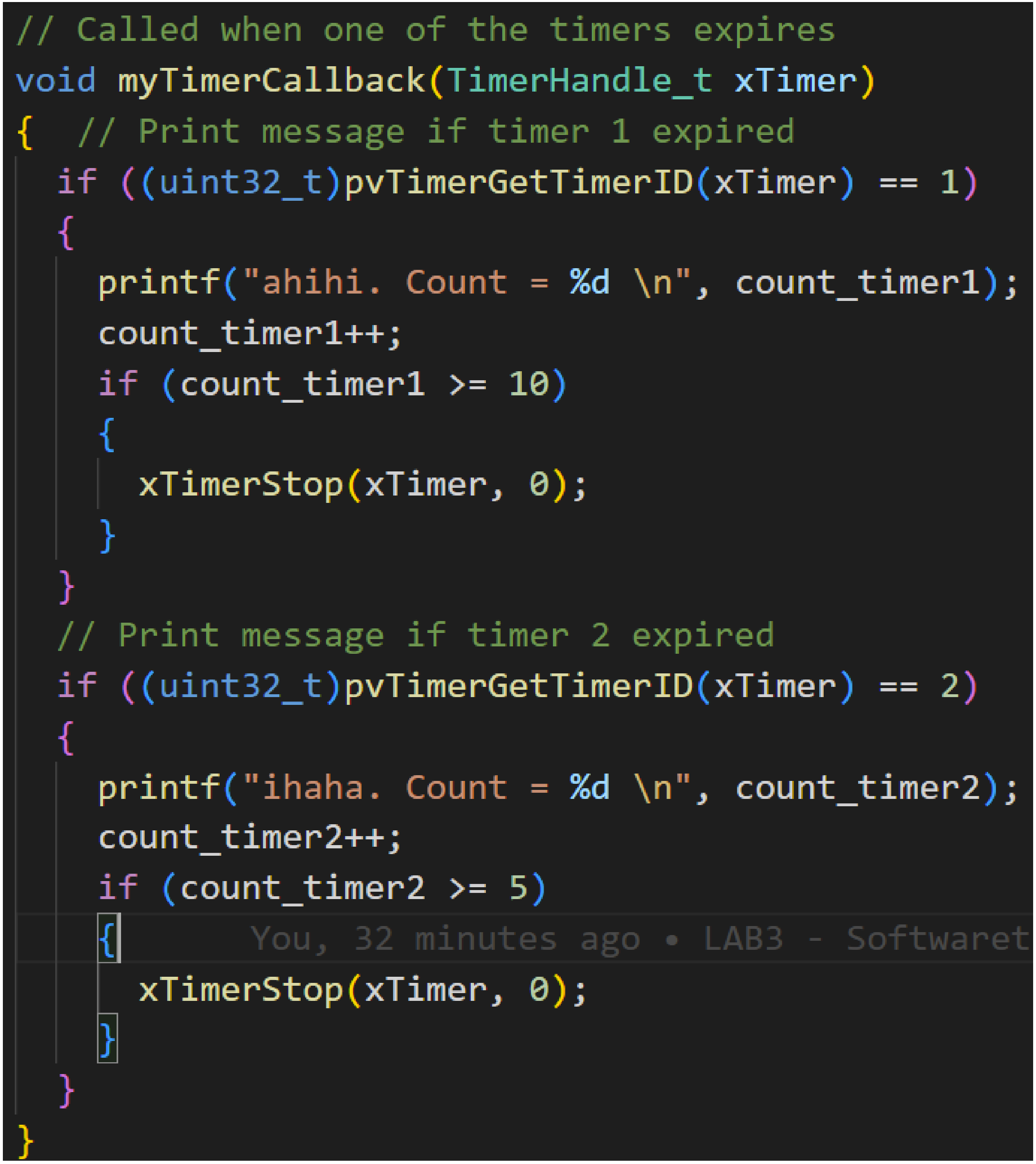
```
// Create auto-reload timer1 - print "ahihi" every 2 second
// after 10 time printing then stop
auto_reload_timer1 = xTimerCreate(
    "Auto-reload timer 1",     // Name of timer
    2000 / portTICK_PERIOD_MS, // Period of timer ( in ticks)
    pdTRUE,                    // Auto reload
    (void *)1,                 // Timer ID
    myTimerCallback);          // Callback function

// Create auto-reload timer2 - print "ihaha" every 3 second
// after 5 time printing then stop
auto_reload_timer2 = xTimerCreate(
    "Auto-reload timer 2",     // Name of timer
    3000 / portTICK_PERIOD_MS, // Period of timer ( in ticks)
    pdTRUE,                    // Auto reload
    (void *)2,                 // Timer ID
    myTimerCallback);          // Callback function
```

4. After creae 2 timer. I set condition to make sure them ok (mean not **NULL**) to Start timer by **xTimerStart(timer, delay).**



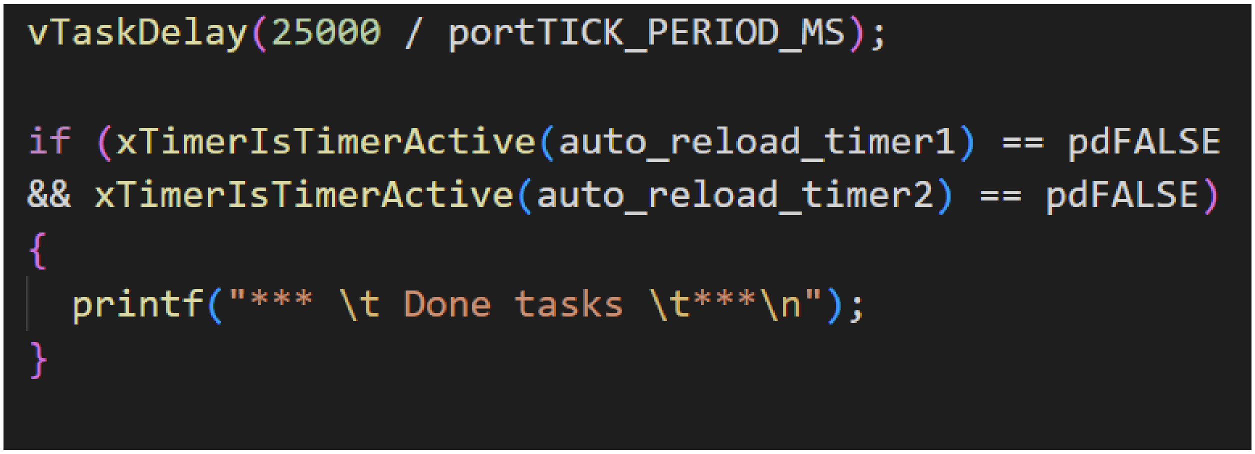
```
// Check to make sure timers were created        You, 18 hours ago • ERR
if (auto_reload_timer1 == NULL || auto_reload_timer2 == NULL)
{
  printf("Could not create one of the timers\n");
}
else
{

  // Wait and then print out a message that we're starting the timers
  vTaskDelay(1000 / portTICK_PERIOD_MS);
  printf("Starting timers...\n");

  // Start timers (max block time if command queue is full)
  xTimerStart(auto_reload_timer1, portMAX_DELAY);
  xTimerStart(auto_reload_timer2, portMAX_DELAY);
}
```

5. In call back function for Timer. I check Timer ID by p**vTimerGetTimerID**. When a timer in 2 timer expires, I check if timer's ID is 1 or 2 then print as requirment. After they done their task, I use **xTimerStop** to stop timer.



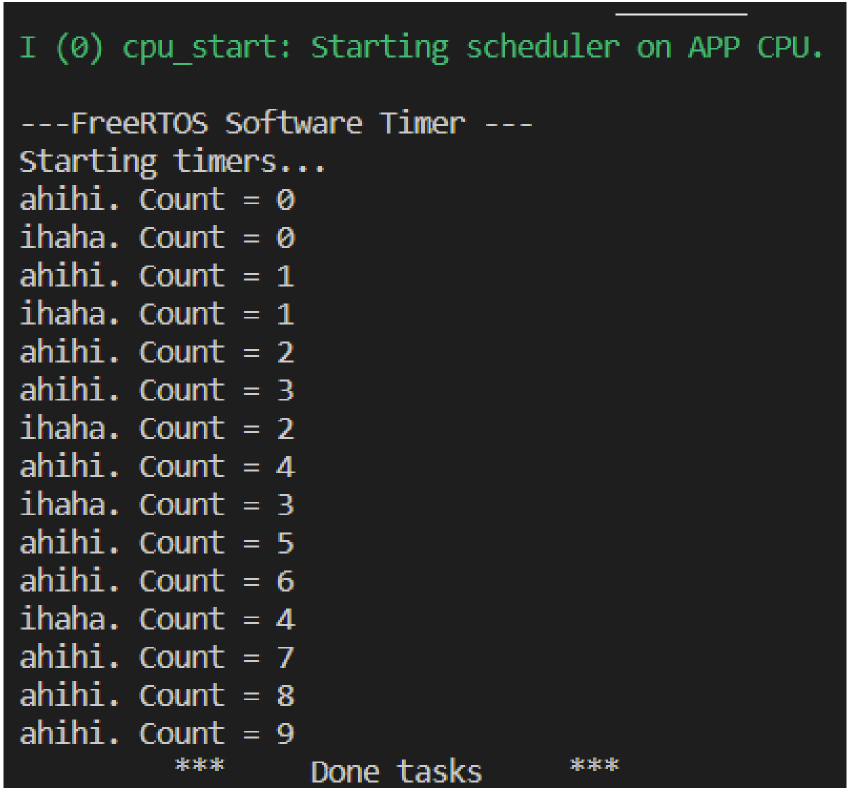
```
// Called when one of the timers expires
void myTimerCallback(TimerHandle_t xTimer)
{  // Print message if timer 1 expired
   if ((uint32_t)pvTimerGetTimerID(xTimer) == 1)
   {
      printf("ahihi. Count = %d \n", count_timer1);
      count_timer1++;
      if (count_timer1 >= 10)
      {
         xTimerStop(xTimer, 0);
      }
   }
   // Print message if timer 2 expired
   if ((uint32_t)pvTimerGetTimerID(xTimer) == 2)
   {
      printf("ihaha. Count = %d \n", count_timer2);
      count_timer2++;
      if (count_timer2 >= 5)
      {        You, 32 minutes ago • LAB3 - Softwaret
         xTimerStop(xTimer, 0);
      }
   }
}
```

6. After 2 timer done there task, about 25 second, I check if true that 2 timer done there task.



```
vTaskDelay(25000 / portTICK_PERIOD_MS);

if (xTimerIsTimerActive(auto_reload_timer1) == pdFALSE
&& xTimerIsTimerActive(auto_reload_timer2) == pdFALSE)
{
  printf("*** \t Done tasks \t***\n");
}
```

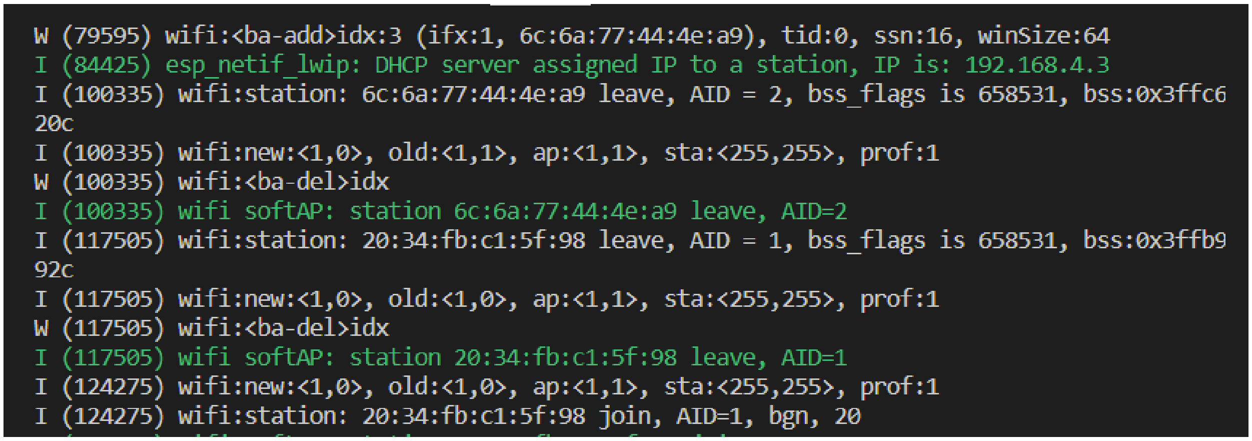
7. Result and github link for project: [HK221_CO3054_ES_LAB/LAB3/LAB3_SoftwareTimer at lab3 · kinggiaan/HK221_CO3054_ES_LAB (github.com)]



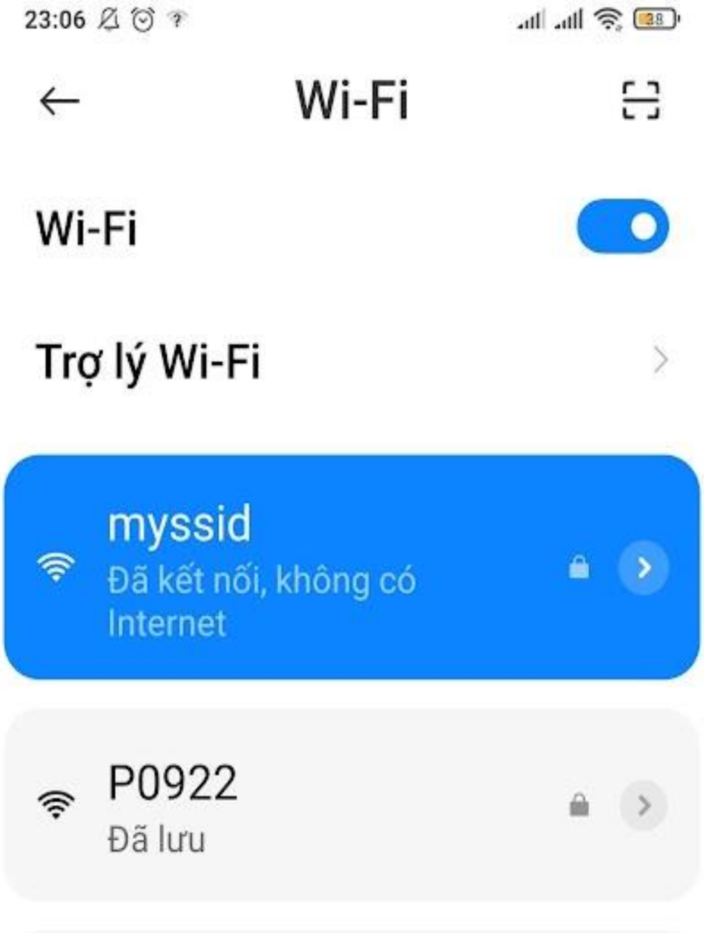
```
I (0) cpu_start: Starting scheduler on APP CPU.

---FreeRTOS Software Timer ---
Starting timers...
ahihi. Count = 0
ihaha. Count = 0
ahihi. Count = 1
ihaha. Count = 1
ahihi. Count = 2
ahihi. Count = 3
ihaha. Count = 2
ahihi. Count = 4
ihaha. Count = 3
ahihi. Count = 5
ahihi. Count = 6
ihaha. Count = 4
ahihi. Count = 7
ahihi. Count = 8
ahihi. Count = 9
          ***       Done tasks      ***
```

II. ESP32: WIFI SUBSYSTEM

By using ESP-IDF template for **softAP** and **STATION.**
esp-idf/examples/wifi/getting_started at master · espressif/esp-idf (github.com)
1. Result for **softAP** that I can connect to my phone to ESP wifi (myssid) :



```
W (79595) wifi:<ba-add>idx:3 (ifx:1, 6c:6a:77:44:4e:a9), tid:0, ssn:16, winSize:64
I (84425) esp_netif_lwip: DHCP server assigned IP to a station, IP is: 192.168.4.3
I (100335) wifi:station: 6c:6a:77:44:4e:a9 leave, AID = 2, bss_flags is 658531, bss:0x3ffc6
20c
I (100335) wifi:new:<1,0>, old:<1,1>, ap:<1,1>, sta:<255,255>, prof:1
W (100335) wifi:<ba-del>idx
I (100335) wifi softAP: station 6c:6a:77:44:4e:a9 leave, AID=2
I (117505) wifi:station: 20:34:fb:c1:5f:98 leave, AID = 1, bss_flags is 658531, bss:0x3ffb9
92c
I (117505) wifi:new:<1,0>, old:<1,0>, ap:<1,1>, sta:<255,255>, prof:1
W (117505) wifi:<ba-del>idx
I (117505) wifi softAP: station 20:34:fb:c1:5f:98 leave, AID=1
I (124275) wifi:new:<1,0>, old:<1,0>, ap:<1,1>, sta:<255,255>, prof:1
I (124275) wifi:station: 20:34:fb:c1:5f:98 join, AID=1, bgn, 20
```



23:06

Wi-Fi

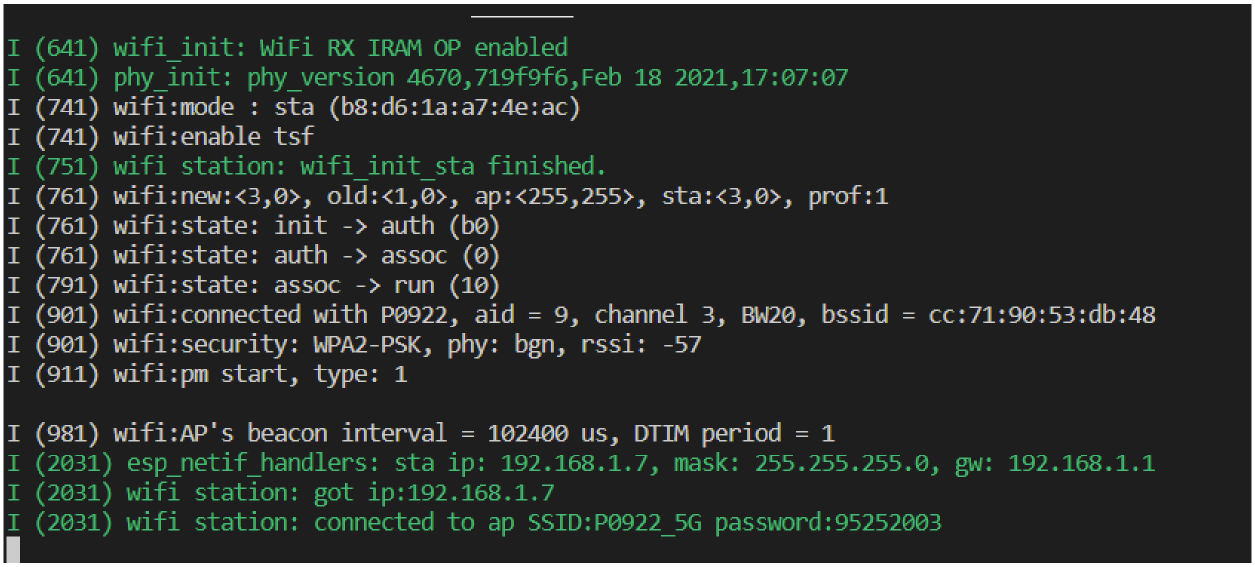
Wi-Fi

Trợ lý Wi-Fi

myssid
Đã kết nối, không có Internet

P0922
Đã lưu

2. Result ESP as a **STATION** that connect to my WIFI name's **P0922** and attempt to connect another one's name **P0922_5G**:



```
I (641) wifi_init: WiFi RX IRAM OP enabled
I (641) phy_init: phy_version 4670,719f9f6,Feb 18 2021,17:07:07
I (741) wifi:mode : sta (b8:d6:1a:a7:4e:ac)
I (741) wifi:enable tsf
I (751) wifi station: wifi_init_sta finished.
I (761) wifi:new:<3,0>, old:<1,0>, ap:<255,255>, sta:<3,0>, prof:1
I (761) wifi:state: init -> auth (b0)
I (761) wifi:state: auth -> assoc (0)
I (791) wifi:state: assoc -> run (10)
I (901) wifi:connected with P0922, aid = 9, channel 3, BW20, bssid = cc:71:90:53:db:48
I (901) wifi:security: WPA2-PSK, phy: bgn, rssi: -57
I (911) wifi:pm start, type: 1

I (981) wifi:AP's beacon interval = 102400 us, DTIM period = 1
I (2031) esp_netif_handlers: sta ip: 192.168.1.7, mask: 255.255.255.0, gw: 192.168.1.1
I (2031) wifi station: got ip:192.168.1.7
I (2031) wifi station: connected to ap SSID:P0922_5G password:95252003
```