Practical 5

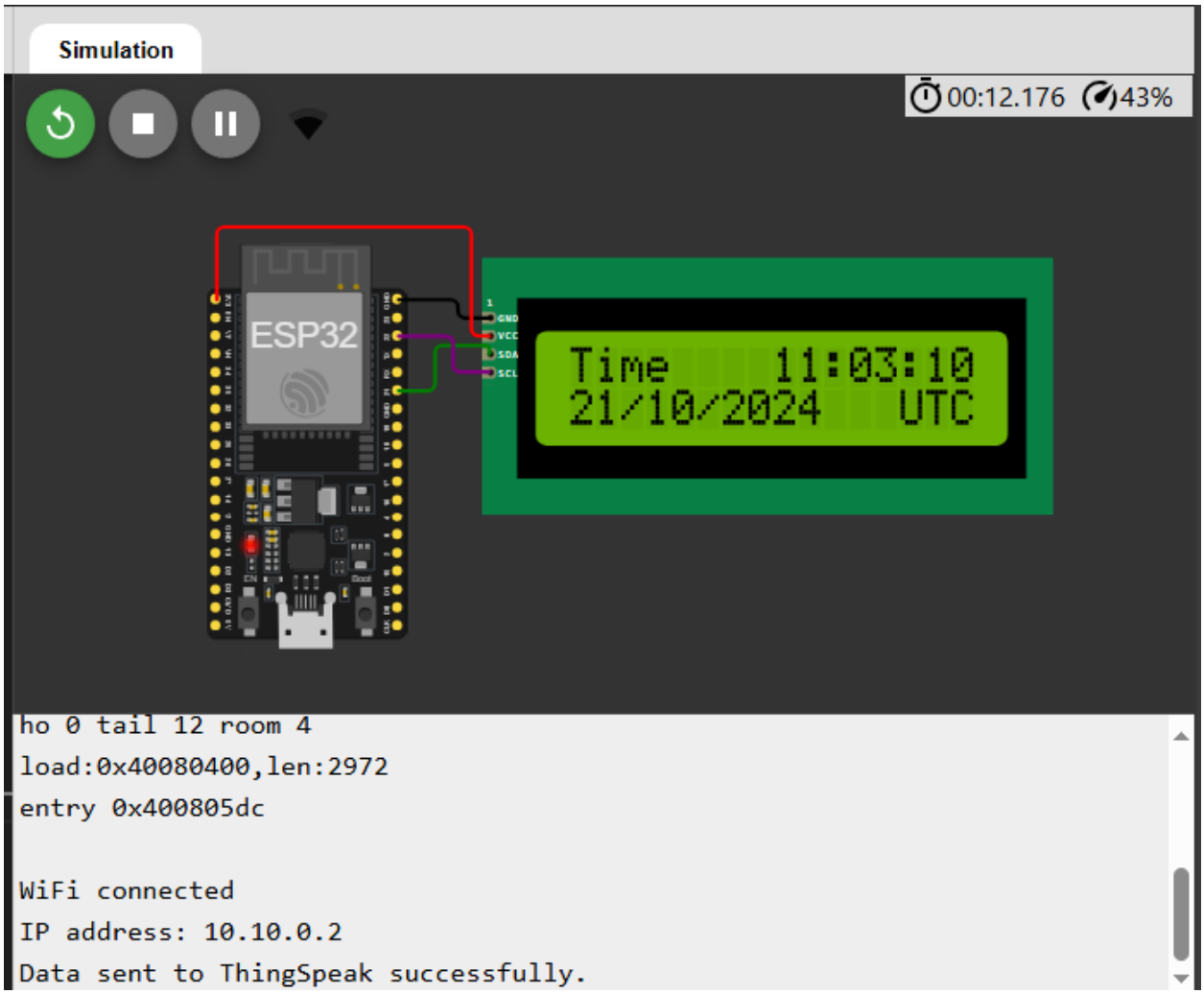
Implementation of Publishing data on ThingSpeak cloud.

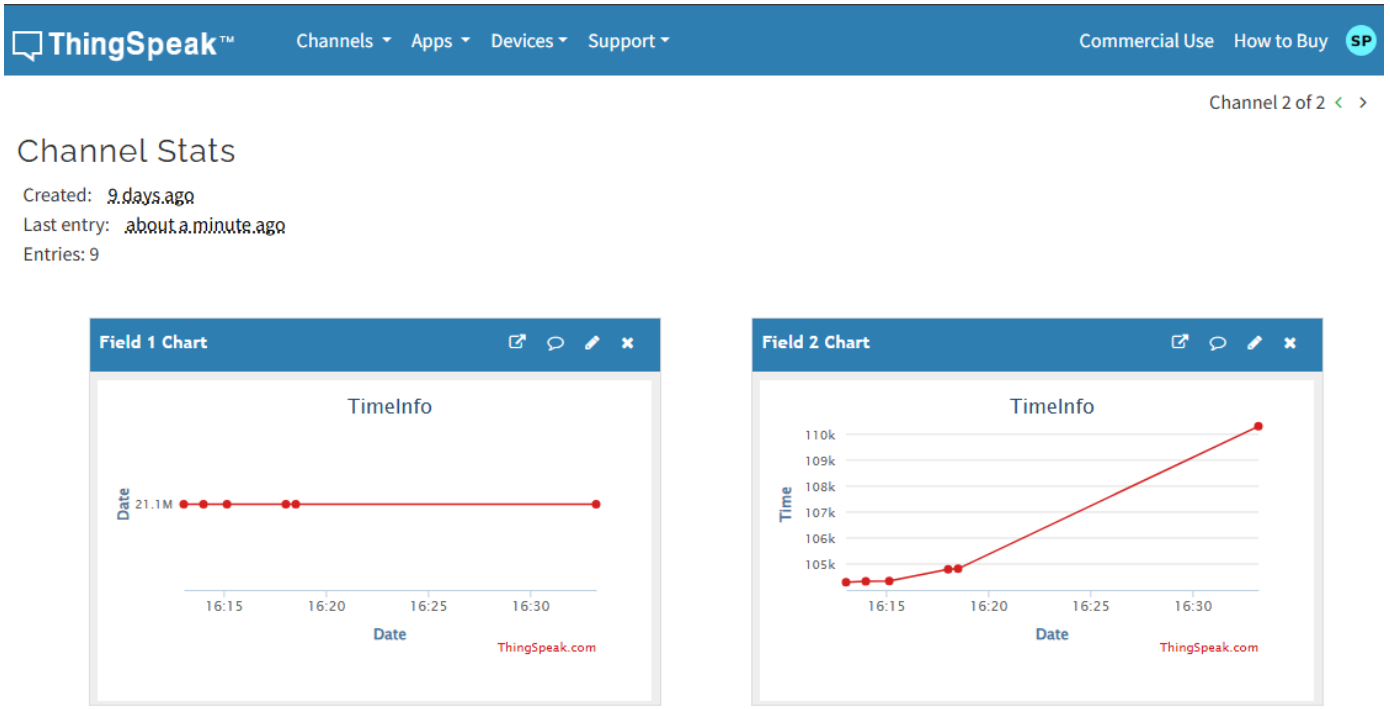
```
#include <WiFi.h> //include WiFi library for internet connection
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
#include <HTTPClient.h>  // Include the HTTPClient library for ThingSpeak communication
#include <time.h>        // Include for time functions

LiquidCrystal_I2C LCD = LiquidCrystal_I2C(0x27, 16, 2);

#define NTP_SERVER     "pool.ntp.org"
#define UTC_OFFSET     0
#define UTC_OFFSET_DST 0

const char* apiKey = "3A9WD6THNG10L8Q9";  // ThingSpeak Write API Key
const char* server = "http://api.thingspeak.com/update";

void spinner() {
  static int8_t counter = 0;
  const char* glyphs = "\xa1\xa5\xdb";
  LCD.setCursor(15, 1);
  LCD.print(glyphs[counter++]);
  if (counter == strlen(glyphs)) {
    counter = 0;
  }
}
```

```
void printLocalTime()  {
  struct tm timeinfo;
  if (!getLocalTime(&timeinfo))  {
    LCD.setCursor(0, 1);
    LCD.println("Connection Err");
    return;
  }

  LCD.setCursor(8, 0);
  LCD.println(&timeinfo, "%H:%M:%S");

  LCD.setCursor(0, 1);
  LCD.println(&timeinfo, "%d/%m/%Y   %Z");
  // Call function to upload the timeinfo to ThingSpeak
  uploadDataToThingSpeak(timeinfo);
}

// Function to upload time data to ThingSpeak
void uploadDataToThingSpeak(struct tm timeinfo) {
  if (WiFi.status() == WL_CONNECTED) {
    HTTPClient http;

    // Format the time as HHMMSS and the date as DDMMYYYY
      String timeStr = String(timeinfo.tm_hour * 10000 + timeinfo.tm_min * 100 + timeinfo.tm_sec);
    String dateStr = String(timeinfo.tm_mday * 1000000 + (timeinfo.tm_mon + 1) * 10000 + (timeinfo.tm_year + 1900));

    String url = server;
    url += "?api_key=" + String(apiKey);
    url += "&field1=" + dateStr;  // Send the time as HHMMSS in field1
    url += "&field2=" + timeStr;  // Send the date as DDMMYYYY in field2
```

```
    http.begin(url);
    int httpCode = http.GET();

    if (httpCode > 0) {
      Serial.println("Data sent to ThingSpeak successfully.");
    } else {
      Serial.println("Error in sending data.");
    }
    http.end();
  } else {
    Serial.println("WiFi not connected.");
  }
}

void setup() {
  Serial.begin(115200);

  LCD.init();
  LCD.backlight();
  LCD.setCursor(0, 0);
  LCD.print("Connecting to ");
  LCD.setCursor(0, 1);
  LCD.print("WiFi ");

  WiFi.begin("Wokwi-GUEST", "", 6); //WiFi.begin(ssid, password, channel, bssid);
  while (WiFi.status() != WL_CONNECTED) {
    delay(250);
    spinner();
  }
```

```
  Serial.println("");
  Serial.println("WiFi  connected");
  Serial.print("IP  address: ");
  Serial.println(WiFi.localIP());

  LCD.clear();
  LCD.setCursor(0, 0);
  LCD.println("Online");
  LCD.setCursor(0, 1);
  LCD.println("Updating time...");
  configTime(UTC_OFFSET,  UTC_OFFSET_DST, NTP_SERVER);
  LCD.clear();
}

void loop()  {

  LCD.setCursor(0, 0);
  LCD.println("Time  ");
  printLocalTime();
  delay(15000);  // ThingSpeak accepts data updates every 15 seconds
}
```


Simulation
00:12.176
43%
ESP32
Time 11:03:10
21/10/2024 UTC
ho 0 tail 12 room 4
load:0x40080400,len:2972
entry 0x400805dc
WiFi connected
IP address: 10.10.0.2
Data sent to ThingSpeak successfully.


ThingSpeak™
Channels
Apps
Devices
Support
Commercial Use
How to Buy
SP
Channel 2 of 2
Channel Stats
Created: 9 days ago
Last entry: about a minute ago
Entries: 9
Field 1 Chart
TimeInfo
Date
21.1M
16:15
16:20
16:25
16:30
Date
ThingSpeak.com
Field 2 Chart
TimeInfo
Time
110k
109k
108k
107k
106k
105k
16:15
16:20
16:25
16:30
Date
ThingSpeak.com