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|  | *Internet of Things Lab for Air quality Monitoring (IoT4AQ)*  *International Workshop – Air Quality & IoT-based Air Sensors*  *14-15 March 2024, Alioune Diop University, Senegal* |

IoT4AQ workshop exercises

# Exercises on the Real Time Clocks

## Introduction

If the ESP32 does not have access to the Internet we must read date and time from the battery backed DS3231 RTC. This however means that the DS3231 has been correctly set before.  
In our standalone IoT4AQ program we must first read the DS3231 and use its values to set the ESP32 RTC. The ES32 RTC will be used for all time functions after that.

The library ESP32Time gives access to the ESP32 RTC while the RTClib allows to read and write the DS3231.

**Exercise 1:**

Write a program to set the ESP32 RTC. Get time and date from NTP. You must connect to WiFi before you can request the time from NTP.  
Use configTime(gmtOffset, daylightOffset, ntpServer) to set the ESP32 RTC  
Read back the time and date from the ESP32 RTC and print it on the serial console

**Exercise 2:**

Modify the program to use the ESP32 RTC settings to set the DS3231 RTC. Use RTClib to accomplish this.

**Exercise 3:**

Write a program to get date and time from the DS3231 and print it.

**Exercise 4:**

Write a program that recuperates date and time from the DS3231 and uses the result to set the ESP32 RTC

### Too easy?

**Exercise 5:**

Access the DS3231 through I2C commands directly, using the wire library, instead of passing through RTClib