

EN2853: Embedded Systems and Applications

Programming Assignment 1

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Index No: XXXXX

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This is an individual exercise!
Due Date: 10 March 2024 by 11.59 PM

Instructions

During weeks 2 and 3 of the course, we discussed microcontroller programming and how to create a Medibox using an ESP32 to remind users to take their medicine on time. Your task is to create a fully-functioning simulation of the Medibox on Wokwi. You can refer to the demonstration done during week 3. Your simulation should include the following functionality.

1. A menu that provides the following options.
 - (a) Set time zone by taking the offset from UTC as input.
 - (b) Set 3 alarms.
 - (c) Disable all alarms.
2. Fetch the time in the selected time zone from the NTP server over Wi-Fi. Display the current time on the OLED.
3. Ring the alarm with proper indication when the set alarm times have been reached.
4. Stop the alarm using a push button.
5. Monitor temperature and humidity levels and provide warnings using proper indication when either or both temperature and humidity have exceeded healthy limits.

Note: Healthy Temperature : $26\text{ }^{\circ}\text{C} \leq \text{Temperature} \leq 32\text{ }^{\circ}\text{C}$

Note: Healthy Humidity : $60\% \leq \text{Humidity} \leq 80\%$

Following the same methods shown in the week 3 demonstration is NOT mandatory. You are free and encouraged to explore other programming techniques to satisfy the above functionality. Use suitable indications to ring the alarm and to provide warnings. A few examples of such indications are as follows.

- Buzzer
- LED
- Message on OLED

Marking Rubric

This assignment accounts for 30% of your final grade. The marks allocation for the required functionality is as follows.

Table 1: Marks Allocation.

Criteria	Allocated Marks
Fetching the current time from the NTP server and displaying on OLED	20%
Entering and navigating the menu	10%
Setting time zone	10%
Setting three alarms	10%
Ringling an alarm with proper indication and stopping an alarm	20%
Disabling all alarms	10%
Displaying warnings if temperature or humidity has exceeded healthy levels	10%
Creativity and neatness	10%

Submission

Submit your Wokwi project together with a video explaining your code and design as a .zip file through Moodle. Instructions for the video:

- Length: Maximum 5 minutes
- Begin your video by stating your name and index number.
- When discussing your code, provide a step-by-step walkthrough explaining key functions and logic used in your code.
- Explain the approaches selected for the implementation of different features.
- Please keep your video camera turned on throughout the entire video presentation. This will help us see and connect with you as you explain your code and make the presentation more engaging. Make sure that your video does not obstruct the important visuals on the screen.