

Homework 2:

- a. Modify the status (switch on / off) of the NUCLEO green LED, every time you snap your fingers. (Use the pin connected to the microphone as an External Interrupt) Hint: look at the files “Green PCB board schematic” and “Nucleo Schematic” and “Nucleo user manual” on Webeep in “Material/Laboratories/Documentation” and find the STM32 pin that connects to SND_IN.
- b. Make the NUCLEO green LED blink at a 1 Hz rate using PWM generation on the corresponding channel

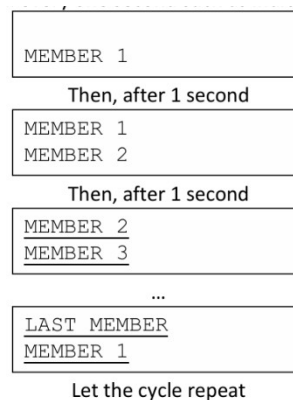
Homework 3:

Objective of this project is to play a song using the speaker when the microphone detects a loud sound

- 1- Conclude the project 2C “play a song” using the HAL_Delay function.
- 2- Try to do again the project 2C “Play a song” without using the HAL_Delay function. Hint: use a timer interrupt.

Homework 4:

- 1- Complete the UART project with DMA, as in slide 10 of pack 04. Tip: enable the global interrupt for the UART!
- 2- Write on the LCD the name of each member of your group, one per line, in alphabetical order. Scroll every one second such as indicated below:



Homework 5:

Try sending from the PC via UART a string of variable length that is displayed on the LCD. Hint: send one letter per time. If you are curious, there are also smarter solutions which are not so immediate.

Complete the ADC projects 2b and 2c:

- 2b. Objective of the project is to acquire the potentiometer voltage using a timer to trigger a conversion at a regular conversion rate of 1 Hz and sending the value to a remote terminal

2c. Objective of the project is to acquire the potentiometer voltage using a timer to trigger a conversion at a regular conversion rate of 1 Hz and showing the value on the LCD

Homework 6:

3a. Objective of the project is to acquire 3 voltages (potentiometer, temperature sensor, Vref) every 1 s and to send them to a remote terminal. The acquisition are started via hardware by a timer and data are saved in the microcontroller memory using DMA.

3b. Objective of the project is to acquire LDR resistance value every ms and to send its average value to a remote terminal every 1s. Step 2: convert the resistance value to a lux level and send that to the remote terminal.

Homework 7:

Read the temperature measured by the LM75 and send it to a remote terminal every 1 second. Modify the code to read all 11 bits within an interrupt routine

Verify that the binary to Celsius conversion procedure you come up works for both positive and negative numbers (see datasheet table 10). Explain the "bug" of LM75B sensors and how you solved it

Homework 8:

1b. Read the acceleration measured by the accelerometer and send it to a remote terminal every 1 second. Using timer interrupts and UART DMA.

1c. Read the acceleration measured by the accelerometer and send it to a remote terminal every 1 second. Using timer interrupts, I2C DMA and UART DMA.

Homework 9:

Objective

Transmit a letter to the LED matrix using SPI and a timer interrupt & Alternate between two letters (or one letter and one symbol)

Homework 10:

Objective Scan each column and read the keyboard using a timer interrupt.

Objective Read the encoder position and send to the PC the rotation speed in rpm.

Homework 11:

Objective of this project is to prepare the two boards to allow wireless communication between them