ELEC335 Lab7

December 31, 2020

The objective of this lab is to read, write and process analog values. You will use C language for the problems unless some parts require *inline assembly*. Use *blinky* project from stm32g0 repo as the starting point for your problems.

Submission

You should submit the following items organized in a folder:

- **Lab report** - Written in English. Proper cover page, intro, problems, flow charts, block diagrams, schematic diagrams, comments, and theoretical, mathematical work, simulation vs.
- **Source files** - should have proper comments and pin connections if there are any external components.
- **Video link** - A link to video demonstration of your lab (this video also should show yourself.)
- **Elf files** - generated elf file with **debug information**.

Compress the folder to a zip file, and submit that way. Each problem should be in a separate folder. Example folder structure is given below.

```
name_lastname_number_labX/
  name_lastname_report_labX.pdf
  video_link.txt
  problem1/
    problem1.s/c
    problem1.elf
    ...
  problem2/
    problem2.s/c
    problem2.elf
    ...
```

Problems

Problem 1

In this problem, you will implement a light dimmer with a potentiometer.

- Connect a pot using a resistor divider setting.
- Connect two external LEDs. These LEDs will light up in opposite configuration.
- By changing the pot you will change the brightness of these LEDs. For example if the pot is all they way down, first LED should light up, and second LED should be off, and if the pot is all the way up, first LED should be off and the second LED should light up. Their brightness should change in between.
- You will need PWM for the LED driving to change the brightness. 0 duty cycle will turn off the LEDs and 100% duty cycle will light them up completely.

Problem 2

In this problem, you will work on implementing a knock counter.

- Connect SSD that will show the number of knocks.
- Connect an external button that will reset the counter.
- Connect a microphone that will pick up the sounds.
- When you knock on the table, you should increment the counter by one.
- There should be no mis-increments, or multiple increments as much as possible.
- You may include an IMU sensor readings to improve your accuracy, but still need to incorporate ADC samples.