Southern Polytechnic College at Kennesaw State University
Electrical Engineering Department
EE 3501 Laboratory Exercise 5: A/D and D/A

Name:_____   **Date:** _____

Learning Objectives:
- How to use the onboard A/D converter to measure analog voltages
- How to use the onboard PWM to output analog voltages

Prelab

1. **Create a new project or clone the project from Lab1.**
2. **Add C or C++ code to create and configure an analog input GPIO pin (Use and modify ADC project in Mbed website). Build a voltage divider using the potentiometer in your kit and connect it to your microcontroller board as shown:**
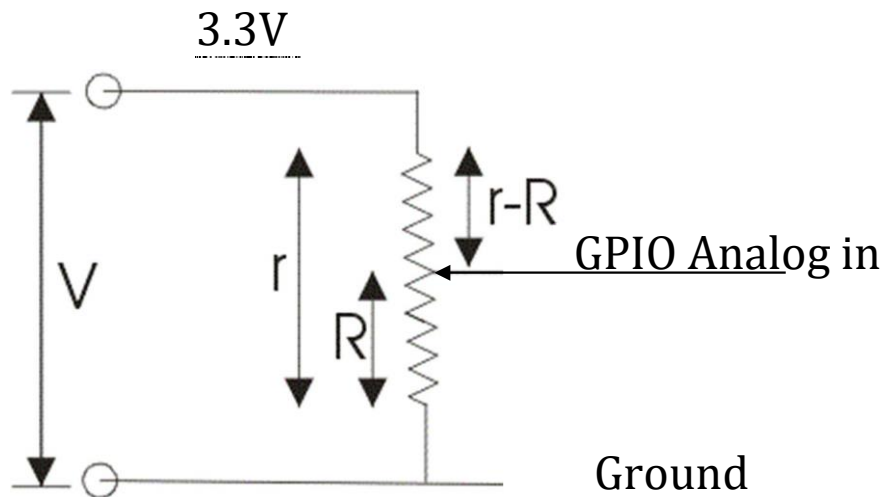
3. **Add code to read the onboard Analog to Digital Converter (ADC). This value will be a binary integer between 0 and 0xFFFF.**
4. **Output this value to the terminal using a printf or cout.**
5. **Put a wait of 1 second, in a while loop to get a measurement every 1 second.**

Laboratory procedure

6. **Demonstrate the output to the laboratory instructor and take a screen shot for your report.**
7. **Add code to convert the binary number you read from the ADC to millivolts and output this to the terminal with a printf or cout. Take a screen shot for your report or show laboratory instructor.**
8. **Configure the PA_5 (LED1) GPIO pin to be a pwmOut (pulse width modulator output) use the binary value you read from the ADC to control the brightness of the LED. You have to do this by setting the period and pulse width so a 0x000 from the ADC results in zero brightness and 0xFFFF from the ADC results in maximum brightness, and various levels of brightness as the user changes the potentiometer. Take a short video and upload to D2L or show to the laboratory instructor.**

Discussion

Explain why is the highest value you can get out of the ADC is 0xFFFF?

Describe the measured values on the terminal and how you set up the PWM to control the LED brightness.

Approved by:_____ Date:_____ Results due: _____