# IECE 553/453 Cyber-Physical Systems
# Fall 2023

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## Lab Assignment 1 - Due Sep 7
## Total Points - 30

1. **(10 points)** Write a C program using `sysfs` to blink the LED connected to the GPIO pin number $P$ for $N$ times. Both $P$ and $N$ should be command line arguments to the programs. The first argument should be $P$ and the second should be $N$. Check for correct input in the code.

   Example:
   `./blinkLED 17 5`
   The above command will blink the LED connected to GPIO pin 17 for 5 times.

2. **(10 points)** Implement a four bit counter. Make a circuit to connect four GPIO pins $P1 - P4$ with four LEDs. Then, consider each LED to represent one bit of a four bit binary number, where LED state 'off' denotes a value of '0' in that bit and 'on' state denotes a bit value of '1'. For example, when all LEDs are off, it denotes $0000_2 = 0_{10}$, and when all are on, it denotes $1111_2 = 15_{10}$. Write a C program using `wiringPi` library that implements a counter that counts from 0 to 15 in binary using the four LEDs. After reaching 15, it should turn off all the LEDs and gracefully exit the program. Do not hard code the binary values, convert decimal to binary in a function.

3. **(10 points)** Setup your code running in lab on Sep 8. You need to show both the software and hardware running together to get the full credit.

**Submission Instructions:**
Name your files using the following convention: `yourLastName_labN_problemM.extension`.
Upload a single tar or zip file in blackboard.