ECE4144 – GPIO Hands On Assignment

Preliminaries:

1. What registers are necessary to set a GPIO pin and to read a GPIO pin? How does each register function?
2. Explain how to set, clear, toggle, or test a bit of a register, without changing the other bits.
3. Enumerate the available GPIO ports/pins available on the playground classic board.

Details:

4. The objective of this hands on assignment is to create a 3 bit binary counter that uses LEDs to count from 0 to 7 in binary, where each LED represents one bit. For example, you should have three external LEDs connected to 3 GPIO pins on your microcontroller. The LEDs should illuminate in binary sequential order, i.e 000, 001, 010, 011 etc. The counter should update every 1 second and reset from 111 to 000.
    a. Select and indicate the three pins you choose on your microcontroller board. Is there any benefit to using specific pins?
    b. Sketch a schematic including the microcontroller, LEDs and any other supporting electrical components.
    c. Write the setup function necessary to set up the appropriate PORTS/PINS.
    d. Write the loop function that updates the LEDs according to the requirement.
5. For problem 1, add any button of your choice to start and stop counter and a second button to reset the counter to 000.