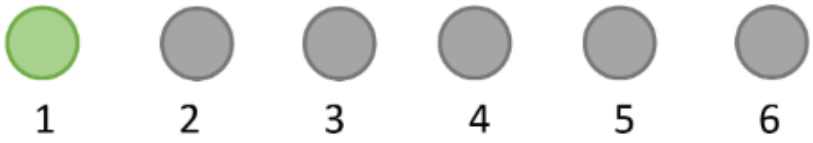
CoE 115 Lab 1B: General Purpose I/O (GPIO)

February 2019

A. Exercise



You will create an LED array which will display a Running Lights Pattern. Arrange 6 LEDs in one row as shown above. Use **RA0, RA1, RA2, RB1, RB2 and RB3** for the LEDs and **RB0** for the push button 1. You may use other I/O pins.

a. [PATTERN] Your pattern depends on the last 5 digits of your student number. The numbers indicate which LEDs are **TURNED ON** for 500ms. Numbers group together must light up at the same time.

SN % 6 == 0	123 - 234 - 345 - 456 - 456 - 345 - 234 - 123 - 234 ...
SN % 6 == 1	12 – 23 – 34 – 45 – 56 – 45 – 34 – 23 – 12 – 23 – 34 ...
SN % 6 == 2	12 – 34 – 56 – 56 – 34 – 12 – 12 – 34 – 56 – 56 – 34 ...
SN % 6 == 3	1 – 6 – 2 – 5 – 3 – 4 – 3 – 5 – 2 – 6 – 1 – 6 – 2 - 5 ...
SN % 6 == 4	1 – 2 – 3 – 4 – 5 – 6 – 5 – 4 – 3 – 2 – 1 – 2 – 3 ...
SN % 6 == 5	1 – 2 – 3 – 4 – 5 – 6 – 1 – 2 – 3 – 4 – 5 – 6 – 1 ...

b. [STARTUP] Upon startup/reset, your device should NOT display the running lights pattern immediately. Instead, turn on all LEDs for 2s, then turn all LEDs off for 2s. Then the running lights pattern should display. [25%]
Note: Pressing the button should **do nothing** while within the 2 second ALL ON/ ALL OFF section of the STARTUP mode [violation = -5%]

c. [PRESS PB] When the push button 1 is pressed, the running lights pattern should PAUSE. [20%]

d. [RELEASE PB] When the push button 1 is released, the running lights pattern should PLAY but in REVERSE, starting off from where it was PAUSED. [35%]

e. Every time the push button is PRESSED, the pattern PAUSES. And every time the push button is RELEASED, the pattern reverses its direction starting off from where it was PAUSED. [20%]

B. Homework

Study the LCD Matrix Reference Manual. This will be used in the lab exercise next meeting.