# Homework #2: ECE 461 / 661

Timers & Counters. Due Wednesday, September 8th
(will accept any time before December 1st so you can use the Micro810 PLC's)

Note: For this assignment, you may use

- Allen Bradley Micro810 PLCs (ECE room 211 or check one out), or
- PLC Fiddle (https://www.plcfiddle.com/)

Windshield Wiper

Write a ladder logic program to control a windshield wiper

Out2: REV Slow
Out3: REV Fast

Out0: FWD Fast
Out1: FWD Slow
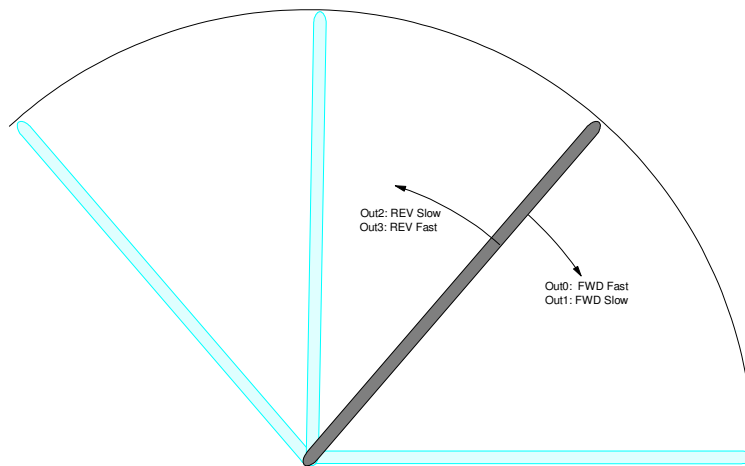
Outputs:

- Out0:   Forward
- Out1:   Reverse
- Out2:   Fast (1) or Slow (0)
- Out3:   Wiper Fluid On (1) and off (0)

Inputs:

- In0:   Stop (all outputs off)
- In1:   Intermittant
- In2:   Slow
- In3:   Fast
- In4:   Clean Windshield

Problem 1: Write a PLC program to control a windshield wiper in intermittand mode
- When IN0 is pressed, the wipers turn off
- When IN1 is pressed, the wipers start a sequence
  - OUT2 = off (slow)
  - Forward for 2 seconds (OUT0 = 1, OUT1 = 0)
  - Reverse for 2 seconds   (OUT0 = 0, OUT1 = 1)
  - Pause for 2 seconds   (OUT0 = 0, OUT1 = 0)
  - Repeat

Problem 2: Add Slow mode
- When IN2 is pressed, the wipers start a sequence
  - OUT2 = off (slow)
  - Forward for 2 seconds
  - Reverse for 2 seconds
  - Repeat

Problem 3: Add fast mode
- When IN3 is pressed, the wipers start a sequance
  - OUT2 = on (fast)
  - Forward for 1 seconds
  - Reverse for 1 seconds
  - Repeat

Problem 4: Add a clean mode (assumes wipers were turned off)
- OUT3 remains on while IN4 is pressed (sprays cleaning fluid on the windshield)
- While IN4 is pressed, the wipers go back and forth in the slow mode (2 seconds forward, 2 seconds in reverse, repeat).
- When IN4 is released,
  - The spray turns off (OUT3 = off),
  - The wipers complete 3 more cycles (forward then reverse)
  - Then the wipers turn off