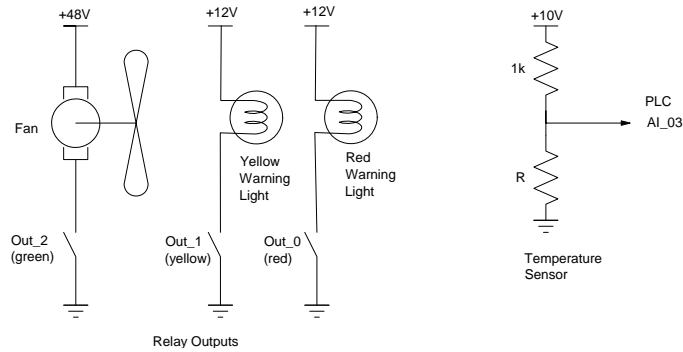


Homework #3: ECE 461

Counters & Analog Inputs. Due Monday, September 14th

Write a ladder logic program for the following system. A Micro810 PLC is connected to a temperature sensor and a fan as follows:



The temperature - resistance of the temperature sensor is

$$R = 1000 \cdot \exp\left(\frac{3903}{T} - \frac{3903}{298}\right) \Omega$$

where T is the temperature in degrees Kelvin (celcius + 273). The PLC is to be able to turn on and off the fan based upon which button you press:

Button & Mode		On Time (4 second period)	Analog Input #3 (Temperature)
0	Fan On	100%	n/a
1	Automatic Mode	100%	> 50C
		75%	40C < T < 50C
		50%	30C < T < 40C
		25%	20V < T < 30C
		0%	T < 20C
2	Fan Off	0%	n/a

To monitor the life expectancy of the motor, turn on the yellow or red LEDs based upon the number of on/off cycles for the fan:

- Out1 (Yellow) Between 10 and 15 on/off cycles (warning - approaching time to replace the fan)
- Out0 (Red) More than 15 on/off cycles (time to replace the fan)

Turn in:

- Screen dumps for your ladder logic program along with an explanation of how it works,
- Verification that all three modes of operation work (On, Automatic, off)
- Verification of the on/off times when in automatic mode
- Verification that you switch modes at the right temperature (or voltage), and
- Verification that you are counting the number of on/off cycles and are turning on the yellow and red LED at the correct number of cycles.