

EGR – 550 ASSIGNMENT 1

SETTING UP TEMPERATURE CONTROL LAB

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Code:

```
PYTHON
> tclab_v1
> tclab_v2
control_1heater.py
control_2heater.py
data_fopdt.py
data.txt
energybalance.py
fit_fopdt.py
heaters_dual.py
ode.py
odein
odeint_2heaters.py
parameter_regression.py
piconontrol.py
test_Heaters.py
test_LED.py
test_Models.py
test_PID.png
test_PID.py
test_Second_Order.py
test_Temperature.py

test_LED.py > ...
1 import tclab
2 import time
3
4 # Connect to Arduino
5 a = tclab.TCLab()
6
7 # Get Version
8 print(a.version)
9
10 # Turn LED on
11 print('LED On')
12 a.LED(100)
13
14 # Taper LED off
15 for i in range(100,-1,-10):
16     print('LED Power ' + str(i))
17     time.sleep(0.5)
18     a.LED(i)
19
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL JUPYTER

```
... time.sleep(0.5)
... a.LED(i)
...
LED Power 100
100.0
LED Power 90
90.0
LED Power 80
80.0
LED Power 70
70.0
LED Power 60
60.0
LED Power 50
50.0
LED Power 40
40.0
LED Power 30
30.0
LED Power 20
20.0
LED Power 10
10.0
LED Power 0
0.0
```

OUTLINE

MATLAB:

```
close all; clear all; clc

% include tclab.m for initialization
tclab;

% Write data to the digital pin
disp('LED on and off repeatedly for 5 seconds')
for i = 0:5
    led(1)
    pause(0.5);
    led(0)
    pause(0.5);
end

% Change the brightness from maximum to minimum using the
% digital pin's PWM duty cycle.
disp('LED dimming from bright to off over 10 seconds')
for brightness = 1:-0.1:0
    led(brightness);
    pause(1.0);
end

disp('LED Test Complete')
```

arduino with properties:

```
Port: 'COM7'
Board: 'Leonardo'
AvailablePins: {'D0-D13', 'A0-A5'}
AvailableDigitalPins: {'D0-D13', 'A0-A5'}
AvailablePWMPins: {'D3', 'D5-D6', 'D9-D11', 'D13'}
AvailableAnalogPins: {'A0-A5', 'D4', 'D6', 'D8-D10', 'D12'}
AvailableI2CBusIDs: [0]
AvailableSerialPortIDs: [1]
Libraries: {'I2C', 'SPI', 'Servo'}
Show <a href="matlab:if exist('a','var'), showAllProperties(a),end" style="font-weight:bold">all properties</a>
```

LED on and off repeatedly for 5 seconds
LED dimming from bright to off over 10 seconds
LED Test Complete

SIMULINK:

