Lecture Material

- Go over posted notes: Week 1 P1 intro, Week 1 P2 Quantixation and Implementing a Nulling filter
- Look at the Nulling filter example folder and try the code
- Look at the A2d_D2A stream folder and run the Simulink – you need to run the mfile to set it up. Change the sampling time – faster or slower keeping Nyqyust in mind – the waveforms change – so sampling time and quantization levels are dependent on one another in recreating waveforms.

Familiarization with Arduino Mega 2560 – this is to be done by each student

- Download the IDE from https://www.arduino.cc/
- Make the Blink program work on your Arduino using the built in LED
- Read Getting started section and you may want to look at the Tutorials https://www.arduino.cc/en/Tutorial/HomePage
- You may want to purchase a very basic book: Programmig Arduino – Getting Started with Sletches by Simon Monk   - McGraw Hill cprt 2016 ISBN 978-1-25-964163-3   there are pdf versions and downloads on Amazon, low cost

Instructor Problem 1:   Modification of the Blink Program

- Using the Demo Blink Sketch (program)as a basis change the sketch so that
- You use two external LED (two different colors)
- Have the blinking alternate from one LEDS to the other so red is on and green is off then they switch.

Instructor Problem 2:   A/D converter basics

- **Reference** https://www.arduino.cc/en/tutorial/AnalogInput   although the schematic is for an UNO converting to an Arduino is obvious
- **Also lookup how to use the Serial Monitor   Sample code follows**

```
// sketch 03-04
void setup()
{
  Serial.begin(9600);
  int a = 2;
  int b = 2;
  int c = a + b;
  Serial.println(c);
}
void loop()
{}
```

- **Using either a potentiometer (see setup in bullet 1 or a voltage divider) write a program that:**
  - o   Samples the A/D input every ½ second (using the delay operator)

     o   displays two numbers on the serial monitor one is the A/D value [0-1023] the other is the corresponding voltage [0- 5] – format anyway you wish those with c experience may be able to put them next to each other

Instructor Problem 3 (combining Prob 1 and Prob 2)
- Write a program that uses the analog input to control two LEDs as follows:
  - If the input voltage is in the interval [2, 3] volts both leds are off
  - If the input voltage is in the interval [0, 2) the red led is blinking (every ½ sec) and the green is off
  - If the input voltage is in the interval (3, 5} the green led is blinking (every 1 sec) and the red led is off

The following link may help:
https://www.arduino.cc/en/Tutorial/ifStatementConditional.   Note you can use the serial monitor to help debug

What to turn in:

    Document your code with your name, date, sketch/proggram name, what it does and anything important – the example sketch above is woofully inadequate in documentation

    A single document in pdf form with

- Header page (see next page)
- the sketches for Instructor problem 1, 2, 3 plus any comments you wish to make about how the codes works or issues you had in getting it to work or things you may have learned.
- a photo of your setup for Instructor 3 showing pot (or divider) and lets connected to mega2560

Keep these Sketches and knowledge of your wiring/setup   we will build on these in the future

Cover sheet follows

Please submit the filled in cover sheet as the first page of you HW submission.

Last Name:_____ **First Name:**_____

Students must indicate the status of each problem by:
- **C** completed,
- **P** Partially completed,
- **N** not attempted

Instructor Problem

Problem	Status	Grade/Comments
1- Dual blinking leds		
2 Potentiometer, A/D and serial monitor		
3 Analog voltage controlling LEDS		
4 Photo of setup		

Final Score:_(10 points)