# (PROJECT 4 DEMO): ADDING FUNCTIONALITY

J. Vining
ECE/CSE 474, Embedded Systems
University of Washington – Dept. of Electrical and Computer Engineering

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**Reviewer:** _____

**Score (of out 150 pts):** _____

**Group Members:**

    **1.** _____

    **2.** _____

    **3.** _____

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# 1.0   COMPILE, LOAD, AND EXECUTE CODE ON ATMEGA (5 PTS)

# 2.0   TASK QUEUE & SCHEDULER (30 PTS)

Doubly linked list insert and delete functions:  How implemented and integrated?

Explain how the scheduler handles time varying task execution using the hardware timer, the global time base, counters, and the insert/delete functions.  Show this in your code during explanation.

# 3.0   STATE OF CHARGE TASK (20 PTS)

Explain how state of charge is calculated using the 2D lookup table in the context of measured temperature, HV current and HV voltage.   Show this in your code during explanation.

Show that the SOC value changes in the TFT display as the temperature, HV current and HV voltage sensor inputs are manipulated via their potentiometers.

# 4.0   MEASUREMENT TASK:  MEASUREMENT HISTORY (20 PTS)

Explain how the System Controller's measurement task tracks measurement history and communicates changes in measurement history with the data logging task in the context of global shared data and flags.  Show this in your code during explanation.

# 5.0   REMOTE TERMINAL AND DATA LOGGING TASK (65 PTS)

Explain how the remote terminal task gets its *display* data (what is shown to the user).  Show this in your code during explanation.

Explain how the remote terminal task gets its *input* data (input from the user).  Show this in your code during explanation.

Explain how the data logging task stores data to EEPROM. Show this in your code during explanation.

Explain how the data logging task knows whether data in the EEPROM needs to be updated. Show this in your code during explanation.

Measurement history value manipulation:
1.  Manipulate the *HV voltage* analog input SLOWLY using the potentiometer to obtain a new **MINIMUM** measurement history value – show the TFT display for measurement confirmation. **Display this value on the remote terminal.**

2.  Manipulate the *HV Current* analog input SLOWLY using the potentiometer to obtain a new **MINIMUM** measurement history value – show the TFT display for measurement confirmation. **Display this value on the remote terminal**

3.  Manipulate the *HV voltage* analog input SLOWLY using the potentiometer to obtain a new **MAXIMUM** measurement history value – show the TFT display for measurement confirmation. **Display this value on the remote terminal.**

4.  Manipulate the *HV Current* analog input SLOWLY using the potentiometer to obtain a new **MAXIMUM** measurement history value – show the TFT display for measurement confirmation. **Display this value on the remote terminal**

**Reset the EEPROM** using the remote terminal. Show that the new minimum and maximum measurement history values have reset by displaying them in the remote terminal. NOTE: Soon after reset, these values should be equal to the current operating state shown on the TFT display.

5.  Manipulate the ***Temperature*** analog input SLOWLY using the potentiometer to obtain a new **MINIMUM** measurement history value – show the TFT display for measurement confirmation. **Display this value on the remote terminal**

6.  Manipulate the ***Temperature*** analog input SLOWLY using the potentiometer to obtain a new **MAXIMUM** measurement history value – show the TFT display for measurement confirmation. **Display this value on the remote terminal.**

**Cycle power** to the system controller and show that the previous EEPROM measurement history values are still available by displaying them in the remote terminal.

## 6.0   CONTACTOR TASK (10 PTS)

Show that the contactors now OPEN under any alarm condition, not just the HVIL interrupt alarm

Now that contactors are OPEN, show that they will not CLOSE if any of the alarms are set.