Murfin ECEN3753 Project Unit Testing Plan

See Task Flow Diagram

UNIT TESTS

**1. LCD Graphics Display Functionality**

Test that graphics can be displayed properly on LCD screen. Implement a pendulum rod, and shift the base at a periodic rate such that we can visually see it traverse the entire needed range of motion.

**2. Reliable Capsense Measurements**

Since some implementations of Capsense measurements can be “glitchy” (you know what I mean), test to find a specific implementation that allows reliable control of at least 4 positions, over a period of 1 minute.

**3. Periodic Execution of “Service Physics”**

Ensure task is entered every period “Tphy”.

**4. Periodic Execution of “LCD Graphics Display”**

Ensure task is entered every period “Tlcd”

**5. Periodic Execution of “Measure Capsense”**

Ensure task is entered every period “Tcap”

**6. GPIO ISR Triggers “LED0 & Button Handler” via Semaphore**

Ensure task is entered following GPIO ISR

**7. “LED0 & Button Handler” adjusts gain value in “Pendulum Parameters” struct**

Ensure that when executed, task can successfully acquire lock of the data struct and edit its gain value.

**8. “LED0 & Button Handler” LED0 PWM Adjustable Operation**

Ensure that task can adjust and run a dedicated PWM timer operation with LED0 – specifically, it can do that while the RTOS is running and the 3 periodic tasks (as described in 3, 4, and 5) are being entered periodically by the RTOS, and the RTOS tick nor any delays, etc. are affecting the PWM.

**9. “Service Physics” Properly Calculating**

Analyze individual execution instances of the tasks’ calculations, ensuring that the rod position values in the data struct are adjusted properly based on physics formulas and initial values, and compare it to a pre-calculated expected value.

**10. “Service Physics”, “Measure Capsense”, and “LCD Display Graphics” Appears Acceptable**

Test the basic operation of the game. The capsense slider should visually adjust position of the rod base.

**11. “LED1 Handler” Rod Fallen Flag**

Test the basic operation of the game, but let the pendulum simply fall. Ensure that “LED1 Handler” task is awoken and the LED1 is de-illuminated, and the game freezes.

**12. “LED1 Handler” Xmax Violation**

Test the basic operation of the game, but push the base to one side keeping the top from falling. Push so far as to push the base outside of boundaries. Ensure that the LED1 Handler task is awoken. Ensure LED blinks on and off at 1Hz and the game does nothing else. Can use OS timer for blink implementation (probably easier than any sort of dedicated timer and the OS will be doing nothing else anyway).

**Progress Summary of Unit Tests**

All tests not ran or implemented, because it is week 1