Tasks completed:

In this final project, we have interfaced hardware with software on the TI TM4C123G board to build a Gas Density Monitor system. After hooking up the board with the external circuit, our code did the following:

* Constantly monitor temperature and pressure
* Calculate expected pressure from the temperature data
* Calculate percent density (actual pressure vs. expected pressure)
* The seven-segment displays will show the integer portion of whatever value is to be displayed by the currently selected mode
  + Density mode will show the density percentage (100% shows as 100) on the seven segment displays, and the mode indicator will show green
  + Temperature mode will show the temperature on a custom scale (0 for -40C, 100 for 60C) on the seven-segment displays, and the mode indicator will show red
  + Pressure mode will show the pressure in psia on the seven-segment displays, and the mode indicator will show blue
* At startup, the display mode will be Density.
* Pressing the display mode selector switch will change the display mode from Density to Pressure, Pressure to Temperature, or Temperature to Density.
* If the current display mode is anything other than Density, and it has been 5 seconds since the last time the mode selector switch was pressed, the display will automatically change to Density mode.
* If the density drops below 85% while the alarm is off, the alarm will turn on. If the density rises above 90% while the alarm is on, the alarm will turn off.

Takeaways:

* We’ve learned to use the ADC module to collect data from sensors and use that to display on the 7 segments.
  + Some things we’ve understood from the configuration and use of ADC: pointers, samples, sample sequences, hardware oversampling, scaling, etc.
* We’ve practiced using interrupts to carry out our tasks
* We’ve learned to use timers and explored the functions to do our tasks
* We’ve ran into problems with the debouncing and timers, but we have managed to troubleshoot them by reviewing the manual and previous labs.
* Lastly, we’ve learned to have a better time management and communications between our lab partners.