Lab 1 Report: Digital and Analog Inputs

Lab Goals:

* Configure GPIO pin(s) as a digital input
* Configure GPIO pin(s) as an analog input
* Configure GPIO pin(s) as an alternate function UART peripheral
* Read and interpret the value of an analog input pin using an oscilloscope
* Initialize UART peripheral and process serial data
* Enable the SysTick Timer
* Write interrupt service routines

Steps to Accomplish Goals:

1. Enable the SysTick timer to generate interrupts every 50uS
   1. Should be used to detect the pulse width of the distance sensor
   2. Should be used to alert the main routine to take an analog measurement of the analog distance sensor every 10ms
2. Configure the GPIO pin connected to SONAR\_PW as a digital input and translate the pulse width into a distance (J7 right facing sensor)
3. Configure the GPIO pin connected to SONAR\_AN as an analog input. This will require configuration of ADC0 (J11 center sensor)
4. Configure the GPIO pin connected to TIVA\_SONAR\_TX and TIVA\_SONAR\_RX as digital pins and alternate function behavior corresponding to UART (J8 left facing sensor)

Problems Faced:

* We had problems configuring the UART to work with the GPIO pin connected to TIVA\_SONAR\_TX and TIVA\_SONAR\_RX. We later realized that UART7 was specific to working with GPIOE, which is the GPIO used for reading data from the sensors
* Our initial board was broken, in that neither the UART connected sensor, nor the pulsewidth sensor were giving us any data. This problem was resolved by swapping out the board with a new one.

Ready Reference:

* The LV-MaxSonar provides very short to long-range detection and ranging (6-inches to 254-inches)
* Readings can occur up to every 50uS
* RX – The output is an ASCII capital “R”, followed by three ASCII character digits representing the range in inches up to a maximum of 255, followed by a carriage return
* RX – This pin is internally pulled high. Will continually measure range and output if the RX pin is left unconnected or held high
* TIVA\_SONAR\_RX (1 << 0) TIVA\_SONAR\_TX (1 << 1)
* SONAR\_PW (1 << 2) SONAR\_AN (1 << 3)