Lab 4 Report: Serial Communication

Lab Goals:

* Learn about SPI and how to set up SSI
* Create drivers for interacting with dogs LCD screen
* Learning the layout of the dogs LCD screen and how the visuals correspond to the actual data
* Coalesce all knowledge of previous labs and interweave their functionality

Steps to Accomplish Goals:

1. Initializing GPIO port D, and setting the appropriate pins to be alternate function, digital output, etc.
2. Redefining the definitions for the various signals to the LCD to help visually organize the code
3. Define the initialization function for the SPI peripheral and initializing the screen itself
4. Create the appropriate functions for:
   1. Setting a page
   2. Setting a column
   3. Writing data
   4. Clearing the Screen
   5. Writing a character
   6. Writing a string to a line

5. Alter main to print the distance to the LCD screen

6. Alter the switch that parses the wifi data to directions to alter the direction string

Problems Faced:

* When printing characters, originally we had an error where the second page would be off by 10 columns. This was a result of having an index variable range from 10->20 and accidentally including that in the column set function for the second page.
* Initial confusion when looking at the provided lcd.c and spi.h files, because there were incorrect function signatures, as well as undefined or unused structs and functions.
* We had to coalesce previous labs together, because we hadn’t been building iteratively on previous labs until now. This involved carrying functions from Lab 1 over that weren’t defined in Lab 3, which is what we based this lab on.
* Printed the distance traveled on the LCD, instead of the distance on the sensor.

\*Notes on waveforms: 3 pictures included, two pictures include two signals at once. In these photos, the top signal is the MOSI and bottom is SCK. The third picture is the UART RX of the sonar sensors.