Memo to: Randy Larimer
From: Johnny Gaddis
Date: 1/22/17
Regarding: EELE 465, Lab 1

Summary:

The purpose of lab 1 was to use the HCS908QG to run a decoder that clocks 4 devices. A transceiver and a Flip-flop were used to read in values from a keypad, and then LED's were flashed using two more Flip-flops based on keypad input. This task was accomplished using branching: when a key is pressed we jump to a specific subroutine. In each specific subroutine, I constantly branch to two subroutines: one for writing to the LEDs and one for Polling for keypress. This lab led to a greater understanding of the HCS908QG while showing students practical uses of microcontrollers.

Setup:

The wiring required for this lab was the biggest part of the setup. A 4-bit bus was connected to four non MCU devices. Two Flip-Flops were set up to set the LEDs, while a Flip-Flop and a transceiver read inputs from a keypad. The code was setup to have subroutines to constantly poll for keypad input and place a global variable on the LEDs.

Static LED Solution:

The first solution was to flash the LEDs with a static value. This was achieved by selecting the LED devices and storing a static value to them. This solution was straight forward and showed that the circuit was wired up correctly and that we can read inputs from A, B, C, and D.

Pattern Solution:

The patterns required for this project were harder to achieve. Values for LED sates were saved in ROM so that they could be referenced. Once a pattern was selected, the value would be loaded in with an offset form the H:X register. Once the pattern is complete the value in the H:X register resets to 0. This solution worked wonderfully and all patterns were achieved.

Final Thoughts:

This lab went according to plan. The research required for this lab was relatively minimal. The only minor hiccup I had was that when D was pressed sometimes the controller would freeze. This was fixed with a slightly (50ms) longer keypress.

Appendix A Flowcharts:

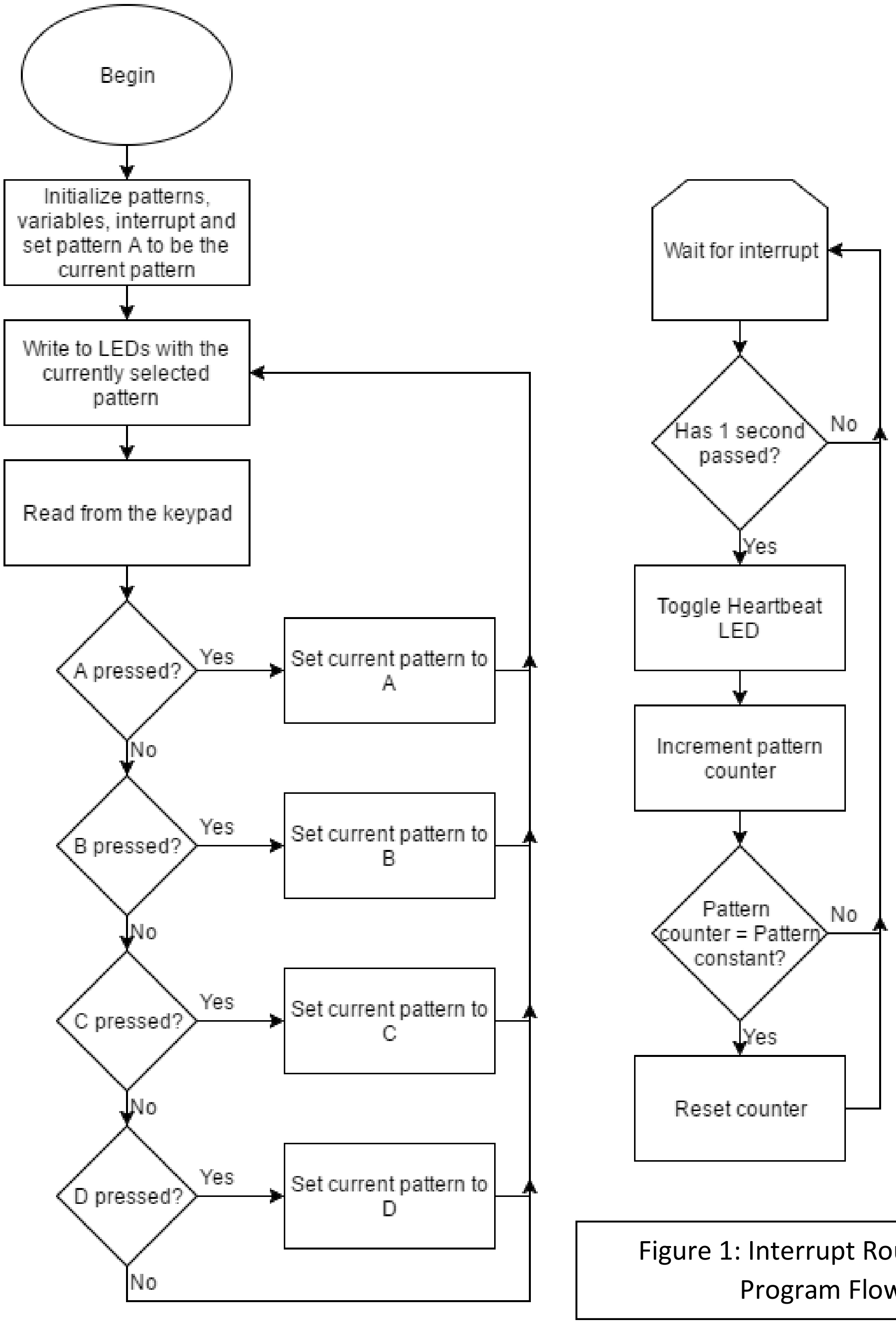

Figure 1: Interrupt Routine and Program Flow