CSE 3442 Embedded Systems I
Fall 2024, Lab 6

This lab is due by November 11, 2024. Using the circuit from Lab 5 and code from Lab 4, follow these steps:

1. Add a command “r” that triggers a resistance measurement cycle activating the control lines in the order discussed in class to measure resistance. The circuit should enable comparator 0 with an interupt output, deintegrate the internal capacitor charge, start a timer, and wait for the interrupt to fire at which time the timer value is converted empirically to a resistance value in ohms.

2. Add a command “c” that triggers a capacitance measurement cycle activating the control lines in the order discussed in class to measure capacitance. The circuit should enable comparator 0 with an interupt output, deintegrate the external capacitor charge, start a timer, and wait for the interrupt to fire at which time the timer value is converted empirically to a capacitance value in Farads.

3. Add a command “l” that triggers an inductance measurement cycle activating the control lines in the order discussed in class to measure inductance. The circuit should enable comparator 0 with an interupt output, wait for the magnetic flux in the external inductor to collapse, start a timer, and wait for the interrupt to fire at which time the timer value is converted empirically to a inductance value in Henries. We will assume that the equivalent series resistance (ESR) of the inductor is small for this lab.

4. Make reasonable attempts to measure the broadest range of R and C possible.

5. Optionally (for extra credit), support a command “auto” that attempts to auto-detect the device under test and measure its value.

6. Demonstrate your lab to the grader.

7. Send your C files to the grader with your name in the header of the file.