This project is a culmination of the last 3 labs from my embedded systems class.
Please take a look at the lab reports for 9-11 included in the repository, for their corresponding code and schematics.

LAB 9:
This lab required integrating a keypad matrix, and an LCD to the AVR128DB48.
I had to generate a pulse with a duty cycle that I could specify on a keypad.
I could also specify a multiplication factor to multiply the duty cycle with.
I will then have to display this information on an LCD.
When I have entered both values, the waveform seen on an oscilloscope will be generated according to the information I provide.

Let me give you an example:
If I type a duty cycle of 25% and a multiplication factor of 1, on the LCD screen, it will display:

Duty Cycle= 025%
T Multiply = 001

Then, when I press enter on the keypad a third time, the oscilloscope should show:

When I press clear and reenter my values as:
Duty Cycle= 025%
T Multiply = 003

I should get the following:

Lab 10:
In lab 10, I incorporated interrupts into my lab 9. This is so that the microcontroller‘s CPU can focus on generating the output waveforms, and only when I press a key will the microcontroller

switch tasks and display the information on the LCD. When I press enter a third time, the microcontroller will update the duty cycle on the oscilloscope as before.

Lab 11:
In lab 11, I incorporated a timer counter into my lab 10. This module can generate the pulses on its own. It only needs the microcontroller to initialize the period of the waves. Like lab 10, the microcontroller will continue to update the LCD on every interrupt. This guarantees minimized usage of the microcontroller's CPU, which can be useful in applications that require several modules, or if you want to save power.