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Digital Systems Design I
Lab 8 – PWM

In this lab, the goal was to control the brightness of an RGB LED using pulse width modulation. I started with a basic PWM generator that works by comparing an external counter to an internal counter and setting the PWM signal high or low accordingly. The external count value is what controls the duty cycle, and this value comes from a counter module. This counter module counts from 0 to 15 to 0 using a direction flag. The process then repeats to generate a variable duty cycle. At 0, the duty cycle will be 0%, at 15 the duty cycle will be 100%. The PWM signal that is generated is fed back into the counter, which also decides the color to display. Red is the starting color, and after each counter cycle of 0 to 15 to 0, the color will change. I struggled with generating the variable duty cycle. This was due to confusion about how it is supposed to work, as well as trying to create all modules at once before testing individually. Overall, this lab was a success and PWM will be very useful moving forward.