ECE 241 **Lab 8** **Spring 2016**
Date: March 21-25, 2016 **Points: 10**

Lab 8: Driving a LED using PWM

Objective: Using the timer facilities on the Arduino to control the brightness of an LED using Pulse Width Modulation (PWM).

Description of Lab 8:

In many applications, the power delivered to another device must be controlled. For a digital system this is best handled employing PWM and adjusting the Duty Cycle (DC). The process for how to use Timer1 for this purpose can be found in the posted pdf

ECE 241 A > Files > HardwareInterfacing > TimerOneDemo.pdf

And at

http://playground.arduino.cc/Code/Timer1

Using this approach we will be driving an LED circuit, shown in Figure 8-1. We will be wanting to cause the LED to fade from bright to dim and then back to bright, by changing DC on pin 10. Note pin 10 is the only pin free that can be driven by Timer1.

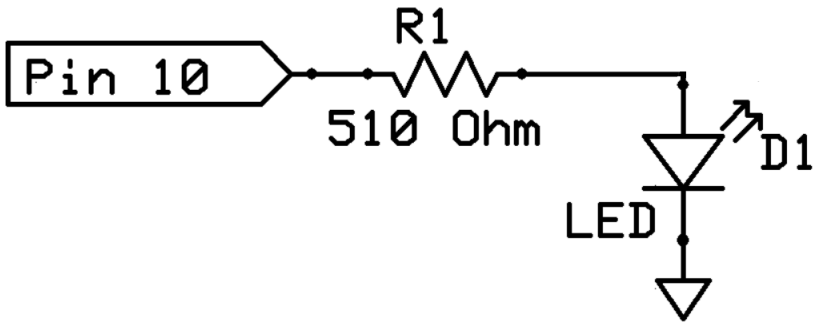

Figure 8-1. Basic LED Circuit.

The process will require that on a certain time interval (100 milliseconds) we will increase DC by 50 (DC on Timer1 has a range of 0 to 1023). Once DC tries to go over 1023, we will need to change over and start decreasing the DC. Once DC tries to go below 0, we will again switch over and start increasing DC.

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Program Structure

SetUp:

Set Timer1 to control pin 10 having a DC of 50% (511) and a period of 500 microseconds

Loop:

Every 100 milliseconds,

Update the Duty Cycle.

Set the duty cycle for pin 10.

end

Build the circuit, write this program and demonstrate it to your instructor.

Your report for this assignment will simply be a copy of your program in a pdf format.