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SIE 370 – Embedded Computer Systems

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Lab 1

Lab Report

1. Task Prototyping (Tinkercad Simulation)

Prototyping Task 1 - Morse Code Circuit was straightforward after learning the logic and functions in the Arduino Blink code example. Designing the Morse Code program taught me the importance of using circuit design software before wiring a physical circuit. Initially, I connected my circuit without simulating a design in Tinkercad. This cost me, as I lost time debugging errors on the physical board that would have taken less time to fix in Tinkercad. The mistake I made in the beginning of the lab was incorrectly connecting the negative wires to the LED's anode and the positive wires to the LED's cathode. I re-learned that the positive lead of an LED is the anode, and the negative is the cathode. After fixing this error, I successfully passed the Acceptance Test for Task 1; I moved on to Task 2 – Intro Pulse Width Modulation (PWM). Building the PWM circuit was much faster. Apart from using Tinkercad first, I designed my program and circuit the same as I did for Task 1. The PWM code was a modification of the Arduino Fade code example. I used the Fade functions and a new LED brightness variable to implement a synchronous inverted fade on two LEDs. My Task 2 Tinkercad simulation also passed the Acceptance Tests.

2. Task Experiment (Physical Arduino)

A paragraph explaining what you accomplished in the in-Lab task using the physical Arduino and hardware components, any problems you encountered, how you fixed it, what you learned, etc. Wiring the Morse Code and PWM circuits to my Arduino UNO in class was straightforward as I had learned from my mistakes before attending my scheduled lab session and practiced the Breadboard and microcontroller connections before lab. I wrote my code in a block style that includes comments above

every line of code and this allowed me to easily debug my program when an error occurred. Understanding the anode and cathode was important as that was the only error that existed with my initial circuit design. Both of my physical designs for the Morse Code and PWM circuits passed the Acceptance Tests.