Executive Project Summary

The purpose of the "pomodoro timer" created in this project is to act as a focused work or study tool. It helps the user limit distractions from their smartphone during focused, 25 minute bursts of work with structured 5 minute breaks between sessions, enhancing the pomodoro study method by requiring that the distraction object (usually a smartphone) stay on the timer while the timer is running. The timer was designed to also fulfill particular design parameters to ensure its safety, ease of use, and effectiveness.

To approach the project, I began by creating a block diagram of the functional blocks in the timer. Using this as a guide for the modules I would need to design, test, revise and put together, I created a planned project timeline for myself, shown in Figure 1. The first major phase of the design process was to draft each section of the electrical schematics that would get the inputs and produce outputs the timer needed. Doing this required iterating between looking at the hardware options available for each section, and drafting a schematic to see how that impacts what other parts are needed and how it would impact the other parts of the system.

When enough of the hardware had been determined, the process of ordering parts and testing the design on a breadboard began, as did the planning for a suitable enclosure. Due to time constraints, the PCB had to be designed and ordered based on the electrical schematic before the LED display could be tested. Using applicable datasheets to the best of my ability, I made sure that the PCB traces led to the correct microcontroller pins, so that any remaining design errors in this block would be resolvable through use of a protoboard in addition to the PCB. During the waiting period for the PCB to arrive, a complete microcontroller program was drafted so that it would be ready for testing as soon as all parts were available to combine.

The final assembly and troubleshooting of the full system was done before enclosing the system, so that all parts would be easily accessible to measure and modify if needed. Finally, the system was placed into the planned enclosure after it was determined that the timer was otherwise fully functioning.
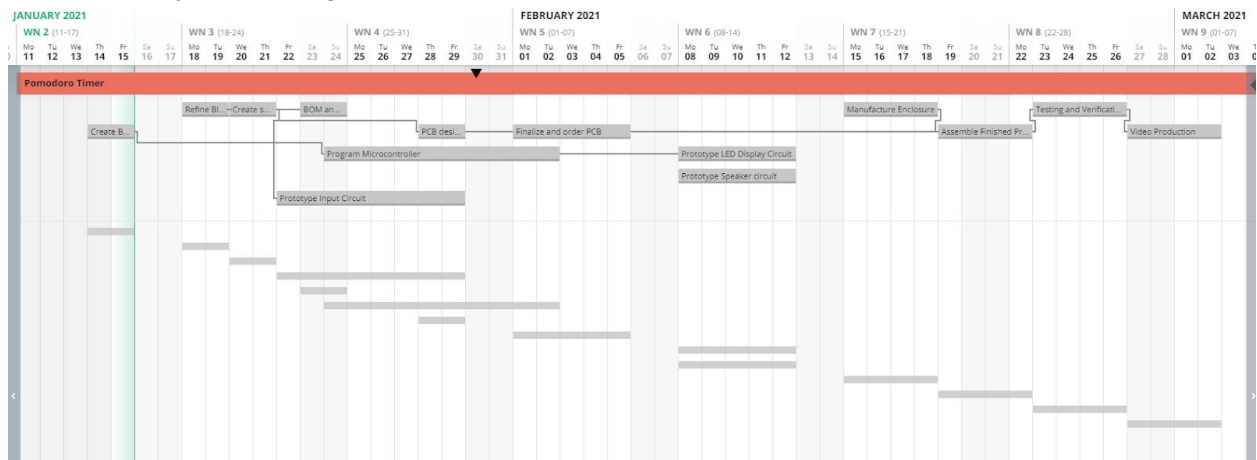

Figure 1: Project Timeline

In doing this project I not only honed a variety of technical skills, including microcontroller programming, PCB design and routing, use of EAGLE schematic software, and use of Autocad 3D modeling software, but also learned about project management and what it takes to take a project from an idea to completion. It was essential in this project to leave time within each task for troubleshooting, a lesson I will be able to apply in future projects. In the scope of troubleshooting, this project taught me not to assume I know what is happening in the circuit and to always measure anyways if something isn't behaving as expected.