Executive Project Summary

The problem this system was created to solve is that of bike safety accessories not including brake lights or turn signal lights, thus making it more difficult for drivers to determine a cyclist's intentions, increasing the chances of an accident occurring. In order for the system to properly increase the safety of the cyclist, the system needed to be robust, safe, automatic, and visible. This meant that the system needed to be able to withstand a 3 foot drop, be water resistant, have a disconnect switch and contain no exposed conductors, control the lights automatically, and have the lights be visible to drivers from at least 40 feet away.

Our team approached this project with usability in mind. Our discussions on the features of the system revolved around ensuring that it was intuitive and easy to use for cyclists. We spent a great deal of time deciding on where we wanted the enclosure of the system to be attached to the bike, trying to visualize the best physical location for the enclosure to be placed. We paid extra attention to the brightness of the lights, making sure that our power supply would be sufficient to ensure that the LEDs were bright enough. Our original design planned to implement an audio cue to inform the user of when the turn signals were active. We did this by using a relay to create a clicking sound, however upon testing we realized that the relays were too quiet to be heard so we tried a solenoid instead. Unfortunately, the solenoid required too much power and prevented the rest of the system from functioning so we decided to forgo adding the audio cue feature. The relays were kept in the system though, because they were also used to simulate the blinking of the turn signals. Another feature we added was a reed switch on the brakes. A reed switch is a magnetic switch that closes when in close proximity to a magnet. By attaching the switch to the brakes, we could have the brake lights activate automatically upon applying pressure to the brakes, instead of activating the lights through calculating a decrease in speed. The code that controlled the behavior of the system ran on an Arduino Nano.

Through this project our group learned the technical skills of PCB design, 3D CAD design, and microcontroller programming. The key soft skill takeaway we learned was the importance of clear communication. We learned to elaborate on the ideas we had for the project components to ensure there were no misconceptions in our vision of the project.
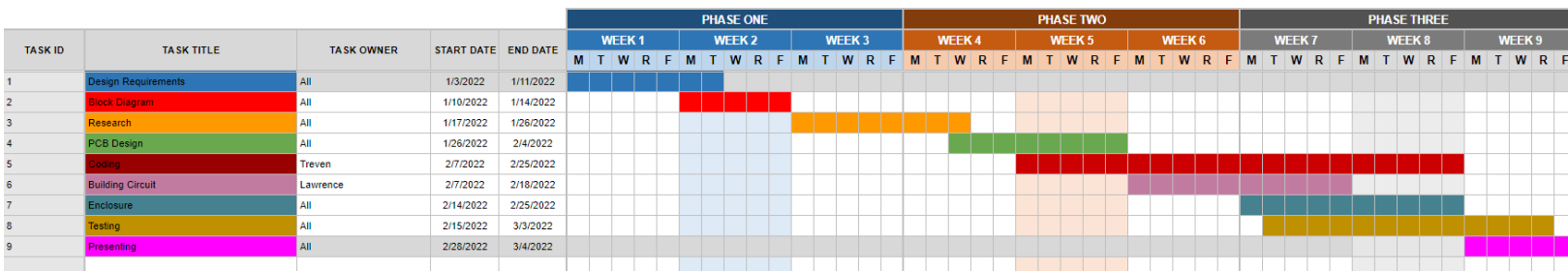

Figure 1. The project timeline