

Executive Project Summary

The original design problem for this project was to create an electronic pet door which automatically opens for pets, locks/unlocks at settable times, and tracks a pet's in/out activity so that the user can view it later. Additionally, our group added the additional requirements that the door would only let in the user's pets by having the pet wear a collar transmitter, and the door would also feature a remote control for wirelessly locking/unlocking the door. We also needed to solve the problems of creating a PCB and ruggedly enclosing all of the electronics of the system.

The approach taken by the group was to first come up with an overall design and determine the necessary blocks of the system. It was determined that the door would need a motor and lock in order to function physically as well as receivers in order to receive data from both the remote as well as the pet's collar transmitter. For the user interface, it was decided that the door would be equipped with buttons as well as an LCD screen in order for the user to interact with the system. An Arduino Mega was chosen for the main microcontroller and brains of the system in order to handle the many inputs/outputs as well as allow for ease of programming.

With the general design in mind, we experimented with different ideas in order to choose specific parts and implementations for the system. Infrared communication was chosen for the remote control as well as the collar transmitter in order to keep the design simple. A servo motor and basic solenoid lock were chosen for the physical aspects of the door. And, a user interface was finally designed in terms of what buttons will be available to the user and how an interface will be displayed on the screen.

With the details of the system figured out, we implemented a large PCB for the door as well as smaller PCBs for the remote and collar transmitter. After receiving the door PCB, there were a few issues that needed to be figured out in order to get it to work. Specifically, the LCD screen did not function correctly on the PCB and only displayed random characters. After lots of troubleshooting, it was determined that the LCD is very sensitive to power fluctuations, so connecting a large capacitor across its input pins solved the problem. With the PCBs fully functional, enclosures were designed in CAD software and 3D printed.

The main lesson we learned as a team during the project was to always prioritize communication and make sure everyone is on the same page. Also, planning as far in advance as possible is always ideal.

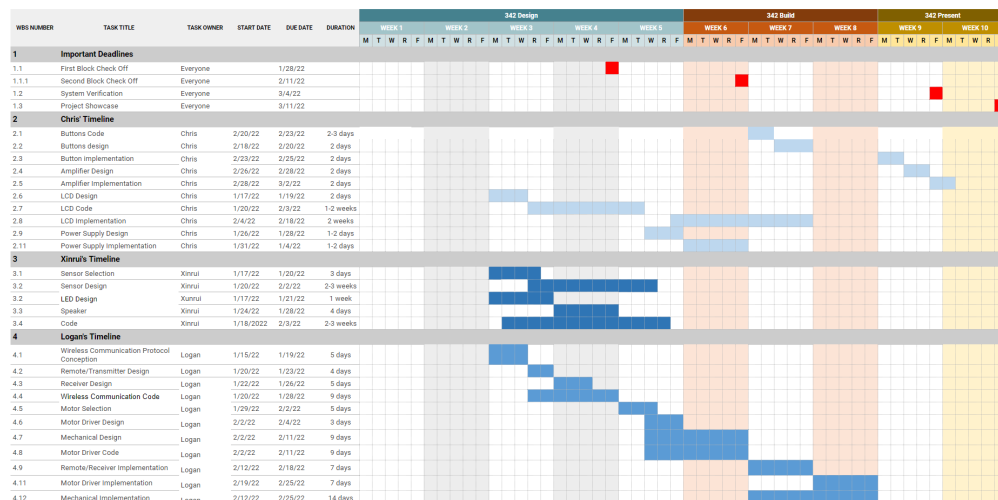


Figure 1: Project Timeline