Executive Summary

The system that we designed and built consisted of the the following requirements originally outlined to us required that the system should display at least 10 unique colors, the system should be able to display alphanumeric messages, the system display should have a resolution of at least 5x5x7, the system should have at least 3 pre-programmed animations, the system should have a GUI that allows users to
design at least 3 new messages and animations, the system display should not appear to flicker to at least 2 people other than the project designers. Finally we added that when powered by battery, the system shall operate for a minimum of 2 consecutive hours without external power being supplied.

Our group approached the project initially by looking at the requirements and what our first steps needed to be. We were aware we needed to plan out and design our project before building and so we started by thinking about how it would look and function according to the requirements. Once we had an idea of how many LEDS we needed, scaling up to 8x8x8 for symmetry we could think of how the PCB would be laid out, and any circurty requirements. We planned on using the power supply we had made from last term's work and could design and electrical requirements around that. Planning out these items and drawing out a block diagram helped us figure out how we would break up the work. The main things we looked at were planning out hardware needs as soon as possible so we could order parts and stay on schedule for building and testing. After that we felt the project would have a large emphasis on programming and setting up the software so that we would be able to control the functionality of the LED cube with a GUI. Splitting up these main needs the three of us worked out in order to develop good ideas and make substantial progress.

Main revisions we made throughout the project was to decide on new definitions for our second set of blocks. During this period of development we had six blocks in total with three checked off at a time. When we reached our second block we had initially set up we had defined a block for the user interface and another for the parsing. There was a lot of overlap between the two in our original design and definitions and so we redefined each block and this redefinition made it more clear for us and, we feel, graders or outside observers to understand how the system is broken down. We also changed our power plans as we originally would have the user choose how to power the LED cube. We added a battery pack that could be used and so we were unsure how we would have that set up for the user originally. We ultimately decided that it would run off the battery, if charged, when unplugged from the power source.

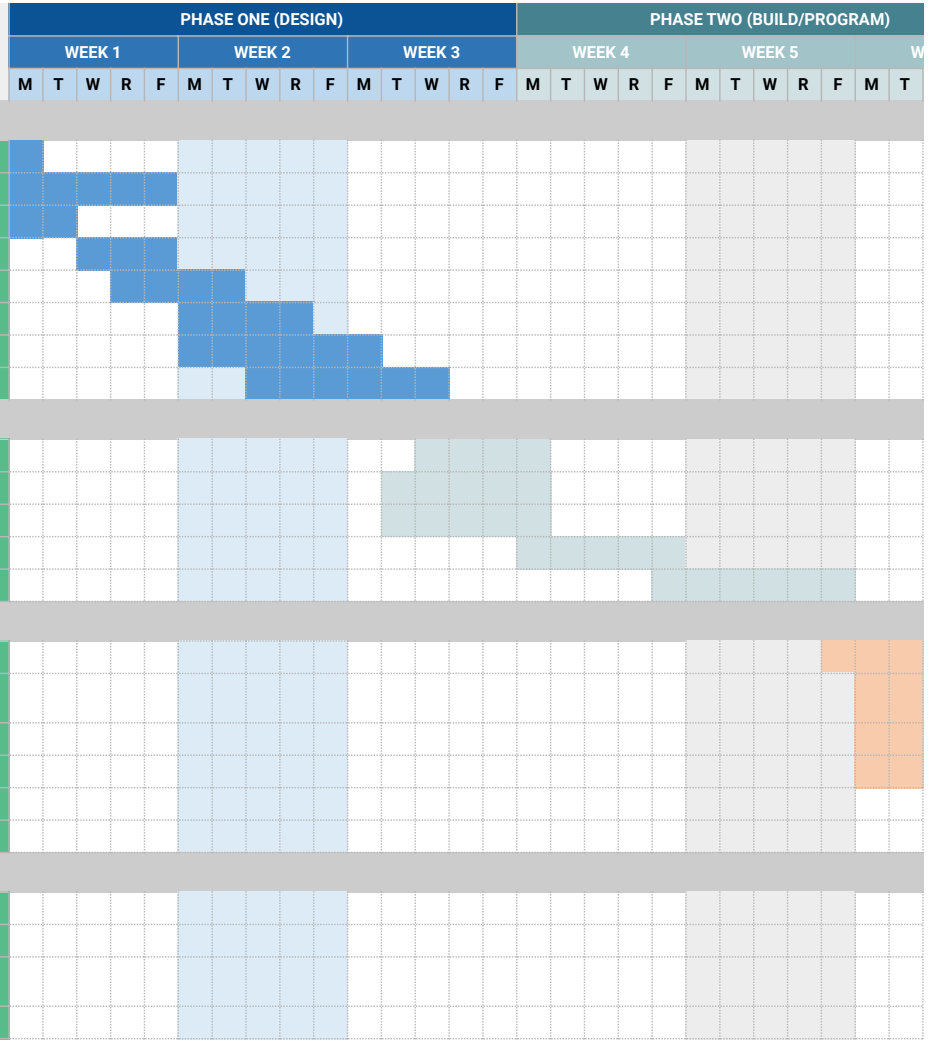
There are a few lessons we can take from this experience. One thing we learned was that our PCB ended up being a bit expensive and we could have made things more space efficient in our design to save on production costs. We also learned about a software we used called Processing. This was used for creating our GUI and all the software/firmware for our project, coded in Java. We were able to use example GUI libraries and modify them to help create a GUI that worked for our needs which was a valuable lesson. Finally we learned that in a remote setting it was very difficult to have only one person test the code on the only cube we built. It would be better in the future to get each member a Teensy (used for sending and receiving software information to be sent to the LED PCB) that they could then use to test out what data is being sent.

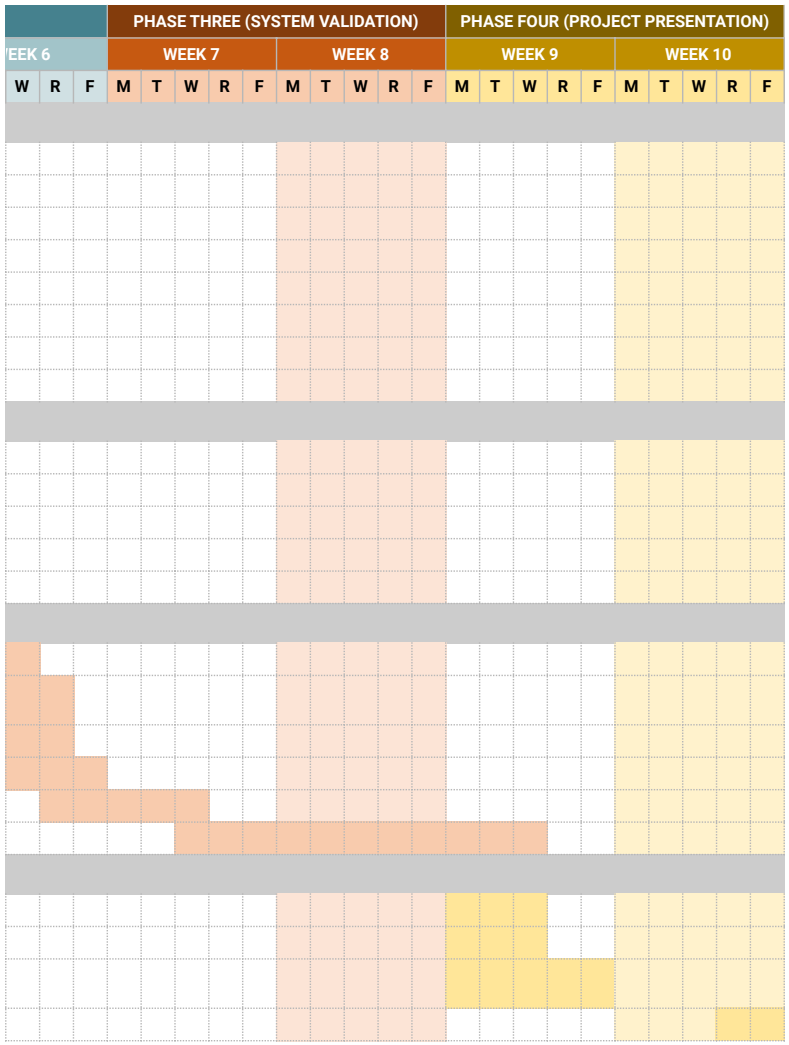
GANTT CHART ECE 342

Smartsheet Tip → A Gantt chart's visual timeline allows you to see details about each task as well as project dependencies.

PROJECT TITLE	ECE 342 JD LED Project	**TEAM NAME**	LED (1)
PROJECT TEAM MEMBERS	Carson Edmonds, Aspen Eagle, Benjamin Green	**DATE**	4/8/21

WBS NUMBER	TASK TITLE	TASK OWNER	START DATE	DUE DATE	DURATION	PCT OF TASK COMPLETE
1	**Design**					
1.1	Project Requirements Review	Ben G	4/5/21	4/5/21	0	100%
1.2	Task List Creation	Team	4/5/21	4/9/21	4	100%
1.3	Scope and Goal Setting	Team	4/5/21	4/6/21	1	100%
1.4	Block Diagram	Aspen E	4/7/21	4/9/21	2	100%
1.5	Research Hardware Components	Ben G	4/8/21	4/13/21	5	100%
1.6	Hardware Design/layout	Carson E	4/11/21	4/15/21	4	100%
1.7	Schematic Design	Aspen E	4/12/21	4/19/21	7	100%
1.8	PCB Layout	Ben G	4/14/21	4/21/21	7	100%
2	**Build and Programming**					
2.1	Hardware Build	Ben G	4/21/21	4/26/21	5	100%
2.2	Program for Color Changing	Aspen E	4/20/21	4/26/21	6	100%
2.3	Program for Alphanumeric Messages	Carson E	4/20/21	4/26/21	6	100%
2.4	Program 3 Animations	Carson E	4/26/21	4/30/21	4	100%
2.5	GUI setup	Aspen E	4/26/21	4/30/21	4	100%
3	**Testing and Troubleshooting**					
3.1	Validate Battery Function	Carson E	4/30/21	5/5/21		100%
3.2	Validate Continuous Function (No flicker)	Aspen E	5/1/21	5/6/21	5	100%
3.3	Validate Usability	Ben G	5/1/21	5/6/21	5	100%
3.4	Validate Animations Work	Carson E	5/1/21	5/7/21	6	100%
3.5	Validate Hardware Ready to Present	Aspen E	5/6/21	5/10/21	4	100%
3.6	Final System Check-Off Prep	Team	5/11/21	5/26/21	15	100%
4	**Project Presentation**					
4.1	Project Summary Video	Carson E	5/24/21	5/26/21	2	100%
4.2	Developer Guide	Ben G	5/24/21	5/26/21	2	100%
4.3	Upload Project Details to Showcase Page	Aspen E	5/24/21	5/28/21	4	100%
4.4	End-of-Project Assessment	Team	6/3/21	6/4/21	1	100%




PHASE THREE (SYSTEM VALIDATION)
PHASE FOUR (PROJECT PRESENTATION)
EEK 6
WEEK 7
WEEK 8
WEEK 9
WEEK 10
W R F M T W R F M T W R F M T W R F M T W R F