**Executive Project Summary**

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## Design Problem

Design a 5x5x7 LED cube capable of at least ten different colors, 3 different user programmable animations, alphanumeric character display, wireless control through a user interface, and an audio reactive mode.

## Design Approach

Following our project timeline, we first began the project by ordering all the hardware components and started work on wireless connection with a UI. From there, we built a prototype on a breadboard which was then moved to a protoboard to begin development of the cube's software. Once our working prototype was verified, we got the PCBs back and constructed our final 7 layer system. After uploading code, we optimized speed to reduce flicker and confirmed animations, messages, and audio mode were displaying properly. A final check showed we were able to control the cube from our GUI and fulfill all the requirements from the project description.

## Project Timeline

### 342 LED CUBE TIMELINE

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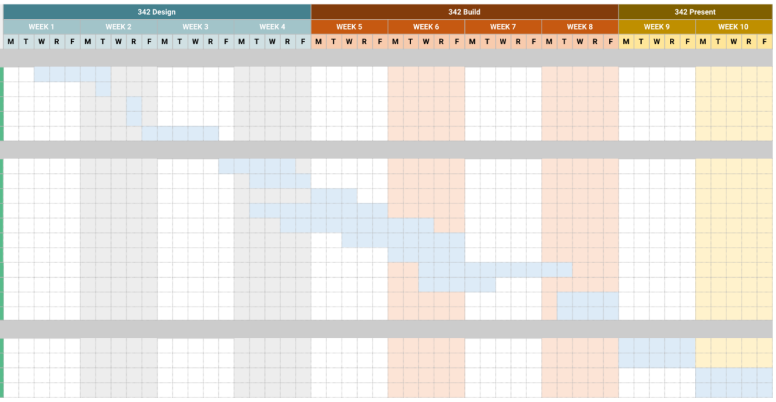
|---|---|
| PROJECT TITLE | LED CUBE Group 1 |
| PROJECT MANAGER | Blake Wiker, Aiden Olsen, James Wilcock |
| Date | 01/14/2022 |

| WBS NUMBER | TASK TITLE | TASK OWNER | START DATE | DUE DATE | DURATION | PCT OF TASK COMPLETE |
|---|---|---|---|---|---|---|
| 1 | **Design Phase** | | | | | |
| 1.1 | Initial Research | Aiden | 1/5/22 | 1/10/22 | 5 | 100% |
| 1.2 | Parts List/Order Parts | All | 1/11/22 | 1/12/22 | 1 | 100% |
| 1.3 | Block Diagram | All | 1/15/22 | 1/16/22 | 1 | 100% |
| 1.4 | LED Solder Jig Creation | Aiden, James | 1/13/22 | 1/14/22 | 1 | 100% |
| 1.5 | Make Schematic | All | 1/14/22 | 1/20/22 | 6 | 100% |
| 2 | **Build/Test Phase** | | | | | |
| 2.1 | Prototype Layer 1 | All | 1/22/22 | 1/27/22 | 5 | 100% |
| 2.2 | Test Layer 1 | All | 1/25/22 | 1/28/22 | 3 | 100% |
| 2.3 | Design and Order PCB | Aiden | 1/31/22 | 2/2/22 | 2 | 100% |
| 2.4 | Prototype Software | Blake, James | 1/25/22 | 2/4/22 | 9 | 100% |
| 2.5 | Design GUI | Blake | 1/27/22 | 2/9/22 | 12 | 100% |
| 2.6 | Integrate microphone | James | 2/2/22 | 2/11/22 | 9 | 100% |
| 2.7 | Test Wireless | Blake | 2/7/22 | 2/11/22 | 5 | 100% |
| 2.8 | Assemble Layers 2-7 | All | 2/9/22 | 2/22/22 | 13 | 100% |
| 2.9 | 3D LED Software | James | 2/9/22 | 2/15/22 | 6 | 100% |
| 2.10 | Final Assembly (PCB) | All | 2/15/22 | 2/20/22 | 5 | 100% |
| 2.11 | Enclosure | James | 2/15/22 | 2/18/22 | 3 | 100% |
| 3 | **Present Phase** | | | | | |
| 3.1 | EXPO Poster | All | 2/28/22 | 3/4/22 | 4 | 100% |
| 3.2 | System Verification | All | 2/28/22 | 3/4/22 | 4 | 100% |
| 3.3 | EXPO Showcase | All | 3/7/22 | 3/11/22 | 4 | 100% |
| 3.4 | Project Portfolio/Video | All | 3/7/22 | 3/11/22 | 4 | 100% |




## Lessons Learned

Prototyping is a very important step, all parts of the project must be verified before moving on and assembling the final hardware. If we were to go through this project again we would prototype the first layer of the led cube with red, green, and blue instead of just red as we did. We found new problems in the code and hardware once we attached the different colors to the PCB which complicated the project. Another lesson we learned was remembering to take speed and efficiency into account when designing our code and hardware specifications.