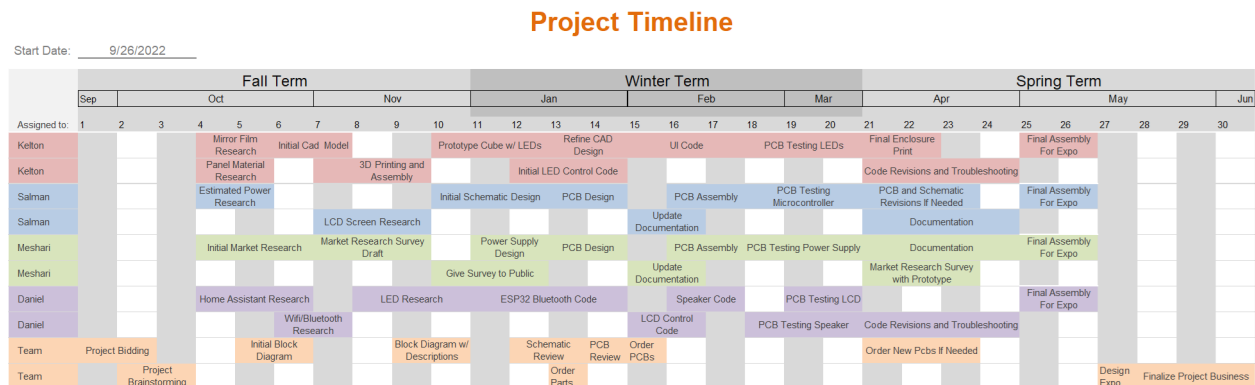## Design Problem:

The design problem we faced was to create a product that could be marketed to an end consumer. We needed to create a product that filled a need a customer had, and design it, so its price was affordable for the customer.

Team approach:

Our team started the project by brainstorming ideas for products we found interesting and thought had a customer base. Once we decided on a product we liked, we conducted market research to determine what features users wanted to see and how much they wanted to pay. With that initial information, we created prototypes of parts of the system to test if they'd meet our requirements. Then, using the data from the tests, we refined our design and created more permanent designs for the system. After we had our more permanent designs, we worked on writing code for the system and developing the UI. With our software and hardware finished, we focused the rest of our time on fine-tuning the UI to be more user-friendly and worked to fix any bugs in the code.

Project Timeline:

Project Timeline

Start Date: 9/26/2022

Term	Fall Term			Winter Term			Spring Term		
Month	Sep	Oct	Nov	Jan	Feb	Mar	Apr	May	Jun

Assigned to:	Tasks by week (1–30)
Kelton	Mirror Film Research; Initial Cad Model; Prototype Cube w/ LEDs; Refine CAD Design; UI Code; PCB Testing LEDs; Final Enclosure Print; Final Assembly For Expo
Kelton	Panel Material Research; 3D Printing and Assembly; Initial LED Control Code; Code Revisions and Troubleshooting
Salman	Estimated Power Research; Initial Schematic Design; PCB Design; PCB Assembly; PCB Testing Microcontroller; PCB and Schematic Revisions If Needed; Final Assembly For Expo
Salman	LCD Screen Research; Update Documentation; Documentation
Meshari	Initial Market Research; Market Research Survey Draft; Power Supply Design; PCB Design; PCB Assembly; PCB Testing Power Supply; Documentation; Final Assembly For Expo
Meshari	Give Survey to Public; Update Documentation; Market Research Survey with Prototype
Daniel	Home Assistant Research; LED Research; ESP32 Bluetooth Code; Speaker Code; PCB Testing LCD; Final Assembly For Expo
Daniel	Wifi/Bluetooth Research; LCD Control Code; PCB Testing Speaker; Code Revisions and Troubleshooting
Team	Project Bidding; Initial Block Diagram; Block Diagram w/ Descriptions; Schematic Review; PCB Review; Order PCBs; Order New Pcbs If Needed
Team	Project Brainstorming; Order Parts; Design Expo; Finalize Project Business

Key Lessons:

From this project we learned many valuable lessons. One major lesson we learned was to seek out and listen to user feedback because it can lead to major improvements in a systems design. We also learned that it is important to divide tasks evenly among group members to both allow everyone to contribute and makes the development process shorter. Finally, we learned that prototyping early means you can discover flaws in a systems design before they become major issues down the road.