Project Title: ShadeSync

Team Name: The Lightbenders

Team Members:

- Matthew Dauria – Collaborative Development Role
- Jake Sussner – Collaborative Development Role
- Brian Quintero – Collaborative Development Role

(Our team works together across hardware, software, and testing. Each member brings unique strengths but all roles overlap.)

GitHub Repository URL: https://github.com/brianquintero13/Senior-Capstone

Trello Board URL: https://trello.com/b/8fFUBatY/shadesync

Brief Summary

ShadeSync is a smart motorized window shade system designed to improve comfort, efficiency, and daily routines. It provides scheduled automation, manual override through physical controls or a remote, and mobile connectivity for convenience. Beyond light control, the system can help regulate indoor temperature by lowering shades when no one is home, reducing energy use. Planned AI features will further adapt schedules to user habits and seasonal changes, creating a reliable and customizable solution for modern living.

Main Features

1. **Scheduled Shade Automation**
   Shades open and close at set times, supporting healthier routines and improving energy efficiency by reducing heat gain or loss when the home is unoccupied.

2. **Mobile Application Integration**
   A companion app allows users to remotely control shades, manage schedules, and customize preferences for greater convenience and flexibility.

3. **Adaptive Intelligence (Planned)**
   Future integration of machine learning will analyze user behavior and seasonal light patterns to recommend optimized schedules, creating a more adaptive system.

Sprint Outline

Sprint 1: Focus on foundational tasks by defining the hardware requirements, selecting components, mounting the shades, and enabling manual control with safety stops.

Sprint 2: Assemble and debug the prototype, implement a reliable timekeeping system, and introduce scheduled automation for morning opening and night closing, with the alarm feature as a secondary goal.

Sprint 3: Finalize the system by connecting the prototype to mounted shades, integrating mobile app control, and adding in-app schedule management, followed by testing for consistency and stability.

MOSCOW Summary:

- **Must Have:** Hardware setup, safety measures, automated scheduling
- **Should Have:** Mobile app control, alarm function
- **Could Have:** AI suggestions, customization options, environmental sensor
- **Won't Have:** Alternative shade types, full cross-platform app deployment

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Extra Work (If Time Allows)

- **Cross-Platform App:** Expand beyond Android to develop a full iOS/Android mobile application.
- **Alternative Shade Types:** Extend functionality to support shades that open left-to-right as well as top-down.
- **AI Behavior Suggestions:** Implement behavior tracking to recommend optimized schedules based on user habits and seasonal changes.
- **Accessibility & Customization:** Add optional features such as LED indicators, customizable alarm sounds, and mobile notifications.
- **Sunlight Auto-Adjust:** Integrate a light sensor to dynamically adjust shades according to user-defined brightness preferences.