

**DEPARTMENT OF ELECTRONIC AND TELECOMMUNICATION
ENGINEERING**

UNIVERSITY OF MORATUWA

EN2160: ENGINEERING DESIGN REALIZATION



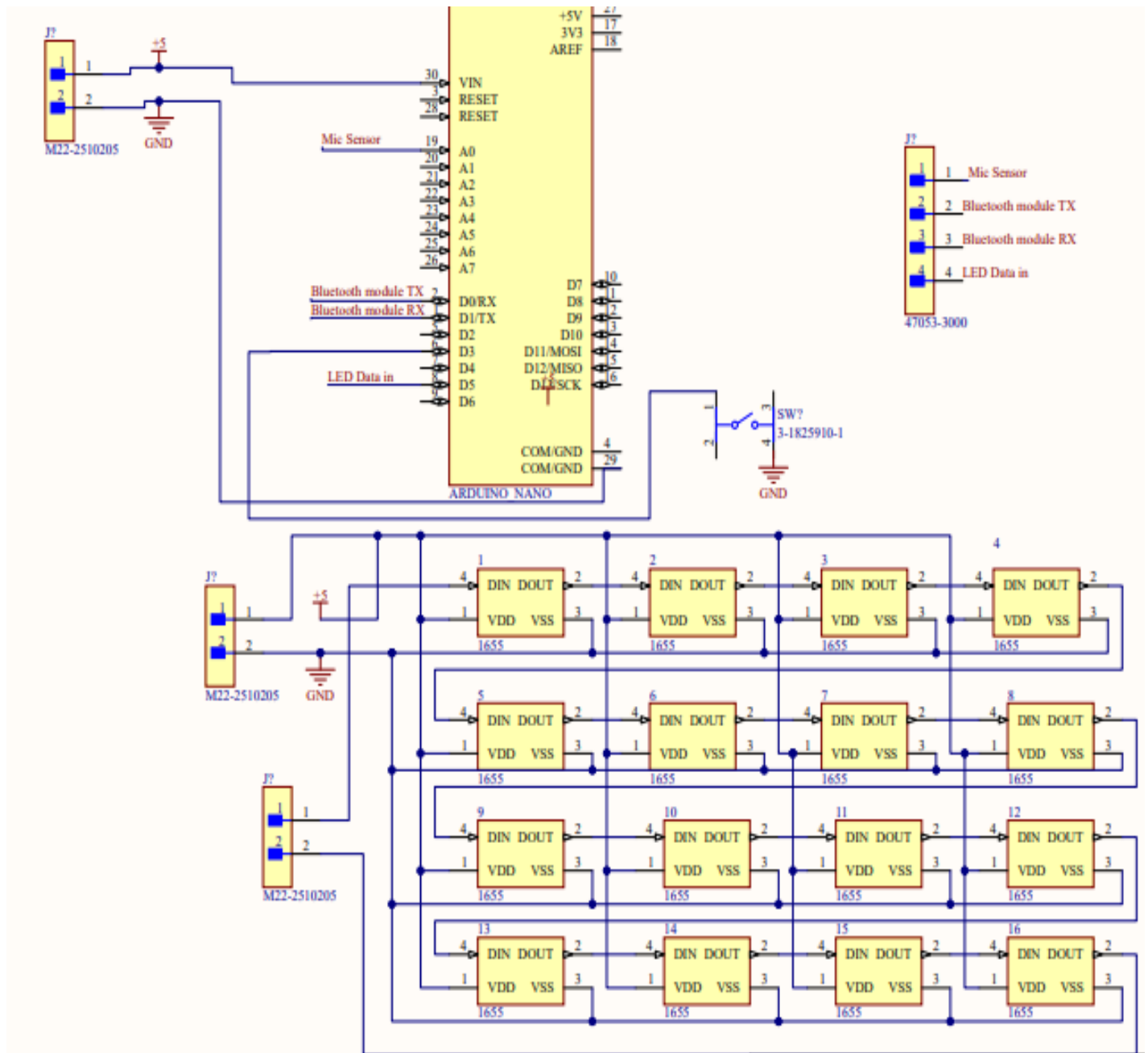
**Report – Preliminary Design
Mood Lamp**

MADUSAN A.K.C.S.

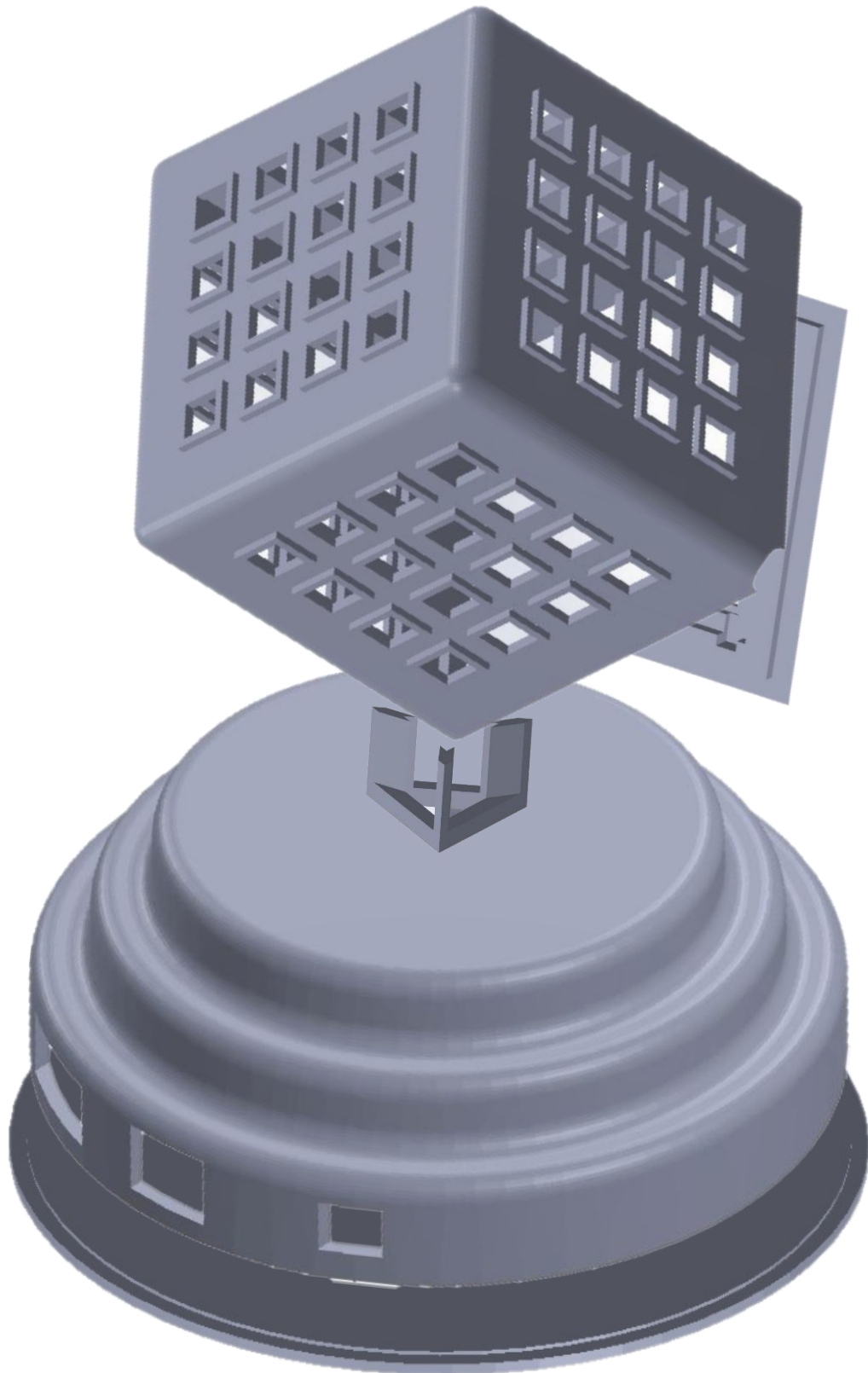
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14st June 2023

Schematic and Solidworks



Implemented SolidWorks



Problems Identified

1. Schematic Design:

- Status box filling: Ensure that the status box provides clear and concise information about the lamp's current mode or state.
- Naming components from top to bottom: Organize and label components in a logical and sequential manner to facilitate easy identification and troubleshooting.
- Minimizing wire usage: Utilize net labels to reduce the need for excessive wiring, improving the overall aesthetics and functionality of the lamp.

2. Enclosure Moldability

- Draft angle analysis: Assess the enclosure design for appropriate draft angles to enable smooth ejection from the mold during the manufacturing process
- Design for moldability: Optimize the lamp's design to ensure it can be produced using injection molding, taking into account factors such as wall thickness, undercuts, and parting lines.
- Injection molding process: Familiarize yourself with the injection molding process and collaborate with manufacturers to ensure the design aligns with their capabilities and requirements.

3. Appearance for Marketing:

- Importance of final appearance: Recognize that the visual appeal of the mood lamp is crucial for attracting customers and creating a desirable product
- Attractiveness through color and texture: Select colors and surface textures that enhance the lamp's aesthetic appeal and align with the desired mood or ambiance.

4. User Need Analysis:

- Gathering user feedback: Conduct surveys, interviews, or user testing sessions to understand users' preferences, expectations, and pain points related to mood lamps.
- User feedback analysis methods: Utilize qualitative and quantitative analysis techniques to interpret and prioritize user feedback, identifying key areas for improvement or additional features.

5. Design Cycle Implementation:

- Proper design process: Follow a systematic design process, including stages such as research, ideation, concept development, prototyping, testing, and iteration.
- Product improvement through design cycles: Use feedback from each design iteration to refine and enhance the mood lamp, ensuring it meets user requirements and resolves identified issues.

6. Product Manual and Documentation:

- User manual: Create a comprehensive user manual that provides clear instructions on setting up, operating, and maintaining the mood lamp, including safety guidelines and troubleshooting tips.
- Maintenance manual: Develop a separate maintenance manual that outlines regular care, cleaning, and replacement procedures to prolong the lamp's lifespan and ensure optimal performance.
- Proper documentation: Maintain detailed records of the design process, including specifications, schematics, BOM (Bill of Materials), manufacturing guidelines, and any design changes made throughout the development of the mood lamp. This documentation helps with future reference, product support, and potential updates.

Problems and Improvements Provided by Group Members

Problems Identified:

1. **Size:** The size of the mood lamp may be a concern, as users often prefer compact and visually appealing designs. Finding ways to minimize the overall size of the lamp while maintaining its functionality is essential.
2. **External wire minimization:** Excessive external wiring can detract from the aesthetics and convenience of the mood lamp. Minimizing the number of visible wires or finding wireless solutions will enhance the user experience.
3. **Analog circuit accuracy:** The accuracy of the analog circuitry in the mood lamp is crucial for producing the desired lighting effects and color accuracy. Any inaccuracies or variations can negatively impact the overall mood-enhancing experience.

Improvements

1. Using microphones to capture ambient noise: Incorporating microphones into the mood lamp can enable it to react to the surrounding environment. By capturing ambient noise levels, the lamp can adjust its lighting patterns or colors accordingly, creating a more immersive and responsive experience.
2. Digital noise-canceling circuit: Implementing a digital noise-canceling circuit can help reduce any unwanted electrical noise or interference that may affect the performance of the mood lamp. This will result in cleaner and more accurate lighting effects.
3. Efficient LED driver circuit: Designing an efficient LED driver circuit can optimize power consumption and minimize heat generation. This will ensure that the mood lamp operates reliably while maintaining low energy consumption and extended lifespan for the LEDs.

Problems Identified:

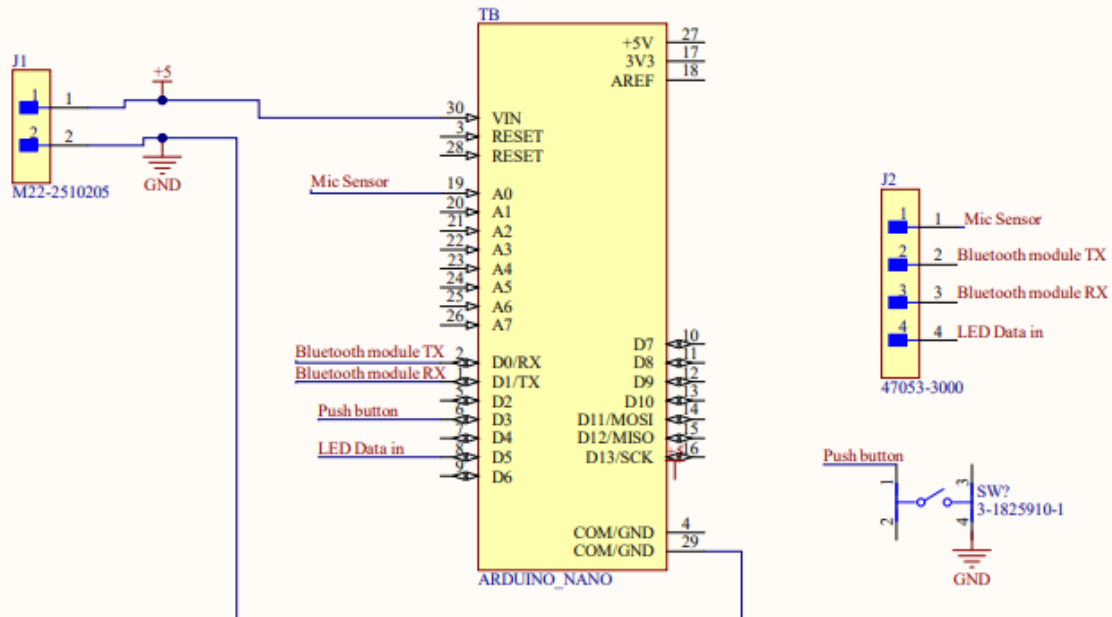
1. **Size:** The user wants to minimize the size of the device as much as possible.
2. **Attractiveness:** The user wants the device to be visually appealing.
3. **External wire minimization:** The user wants to minimize the number of external wires for a cleaner look.

Improvements:

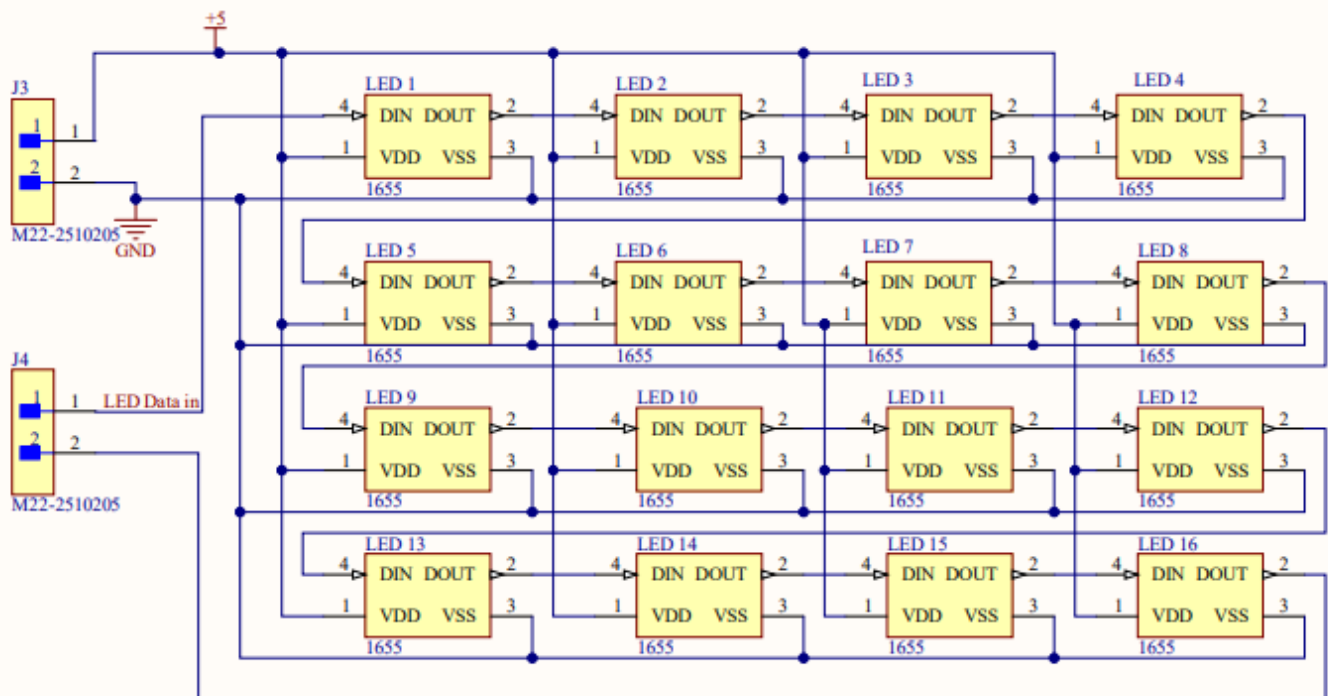
1. **Using Mic Sensor LED music visualization;** A music visualizer effect is a feature that allows the mood lamp's LED strip to synchronize with the beat and rhythm of the music being played. When the visualizer is activated, the LED strip will change colors and patterns in time with the music, creating a dynamic and immersive lighting experience.
2. **Make it more user-friendly shape:** Designing the device with a user-friendly shape can enhance its appeal. Consider a shape that is ergonomic, easy to hold or interact with, and aesthetically pleasing. This can improve the overall user experience and make it more inviting to use.

Schematic

Control Circuit

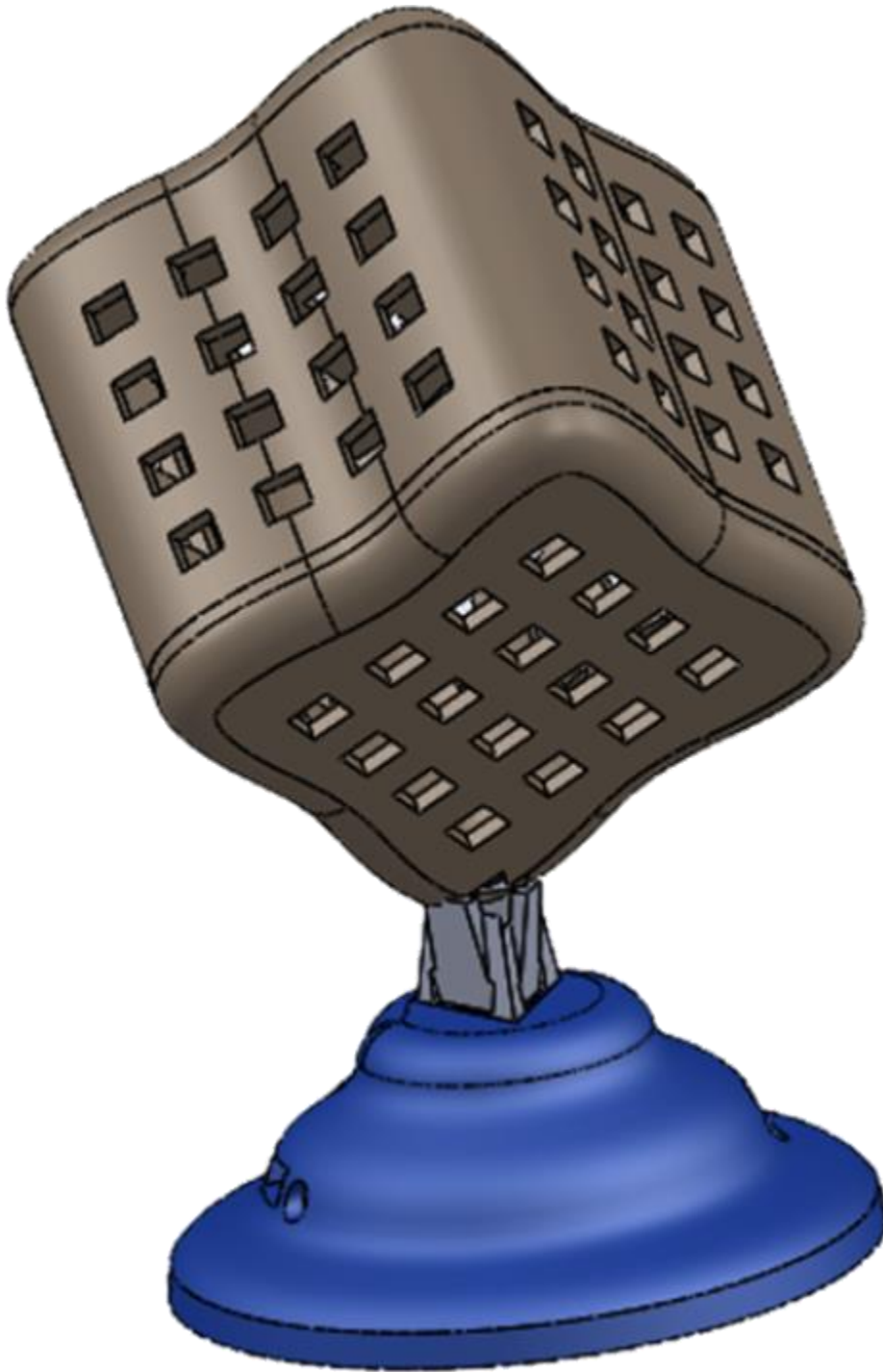


LED Matrix Circuit

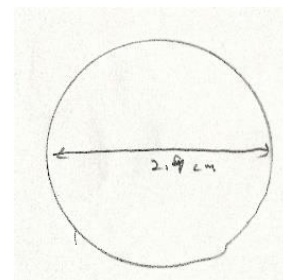
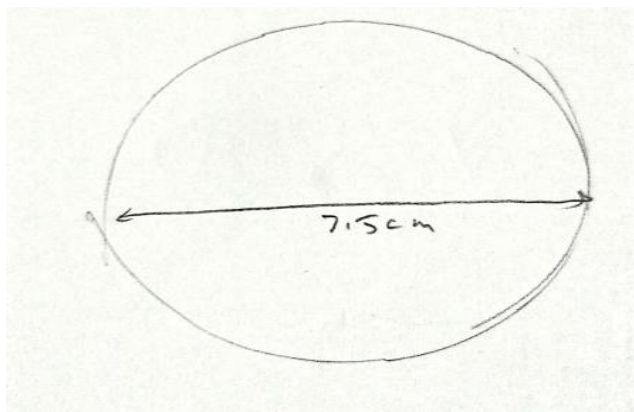
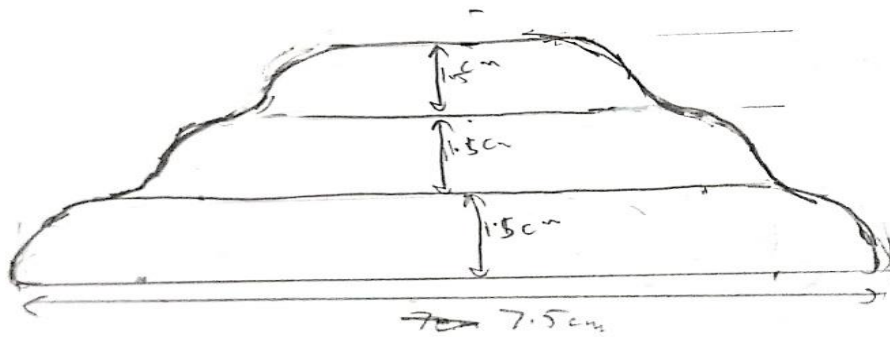


SolidWorks

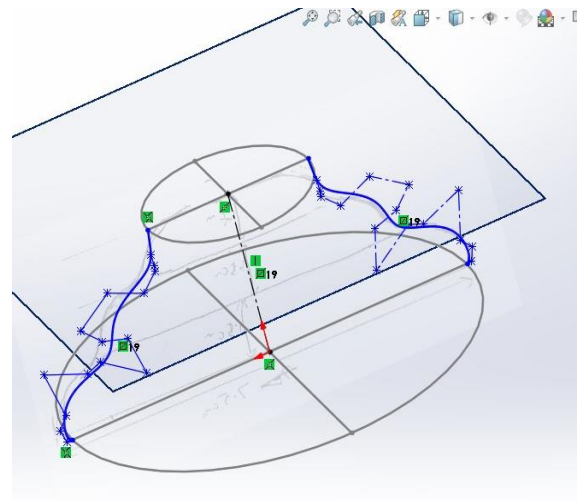
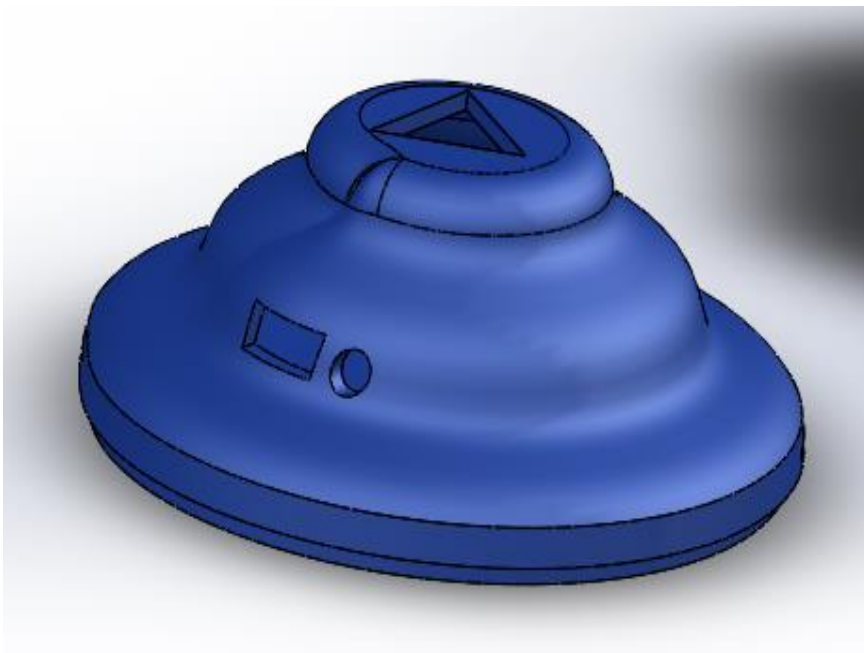
Assembly Encloser

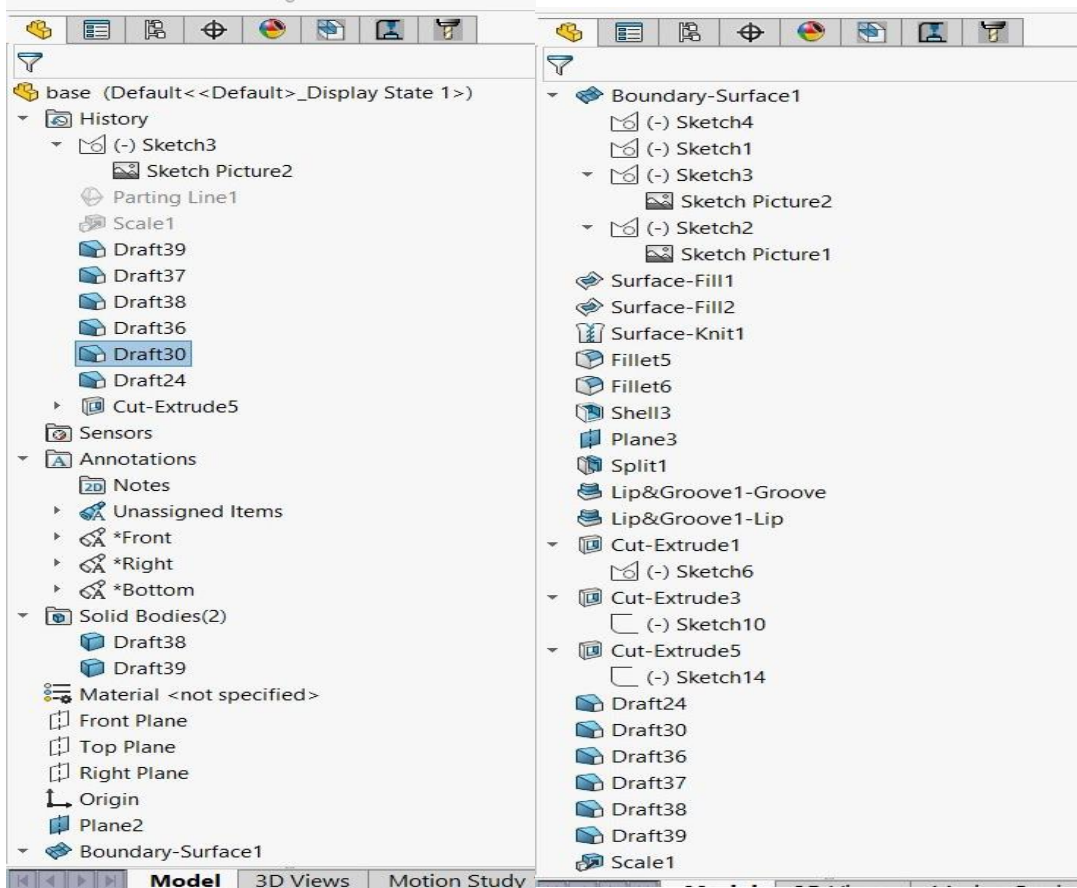


Base part Sketch

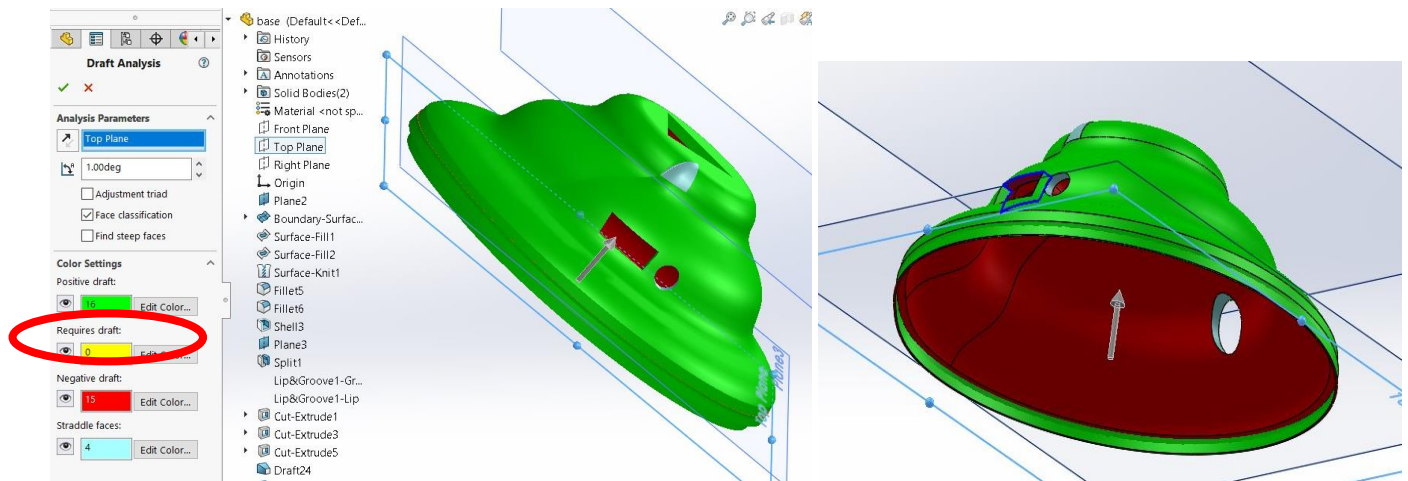


Base part

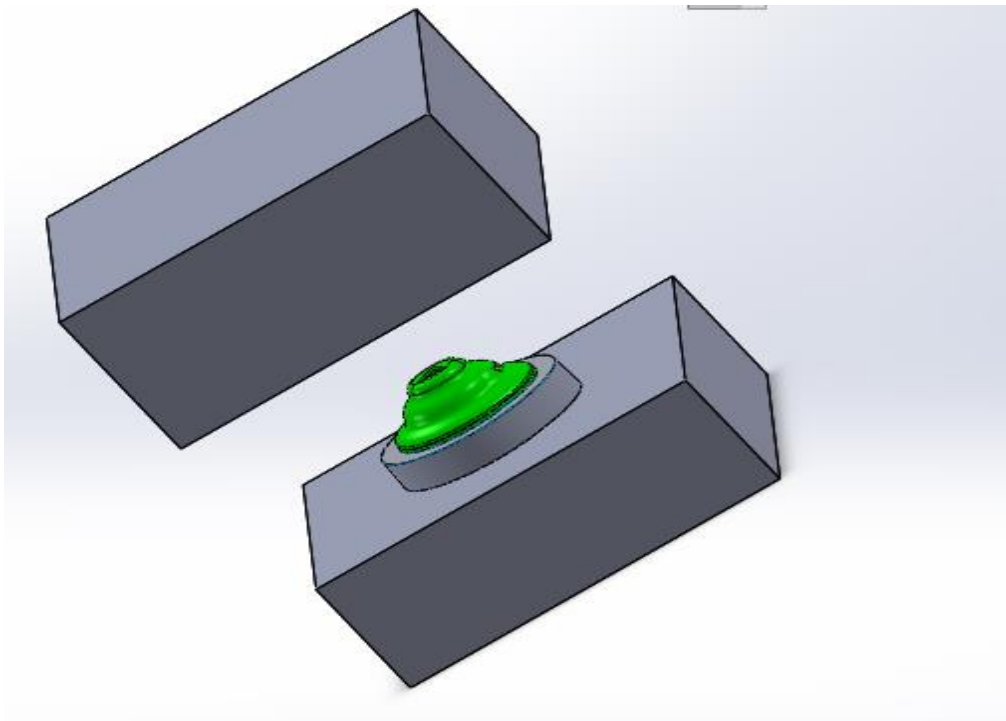




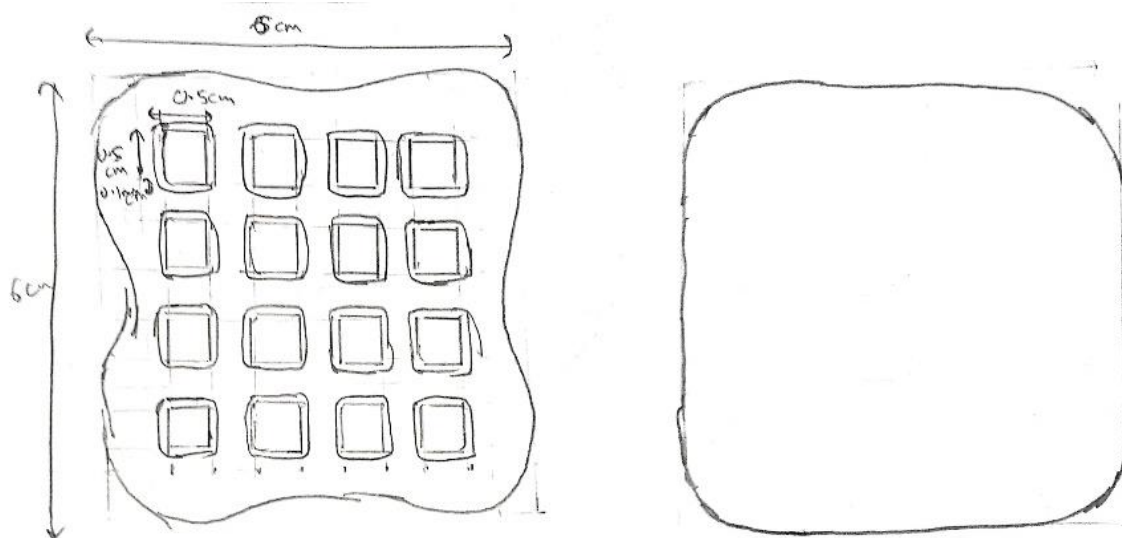
Draft Analysis



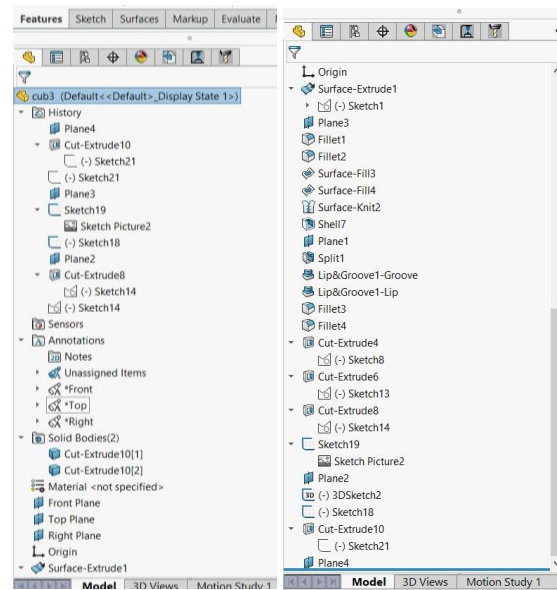
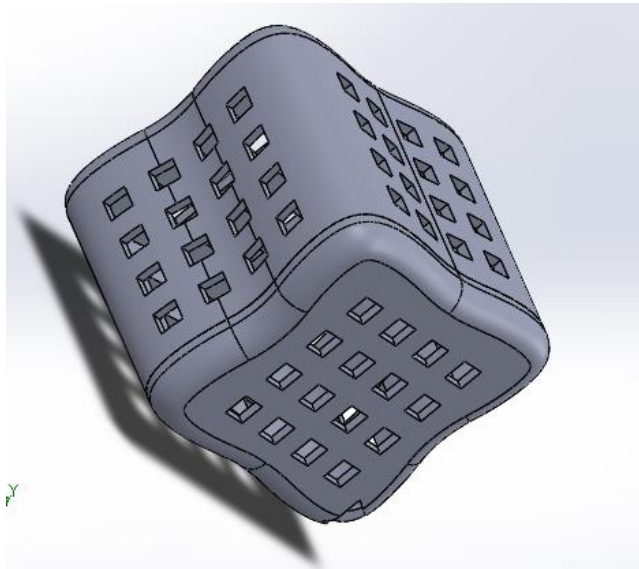
Mold part



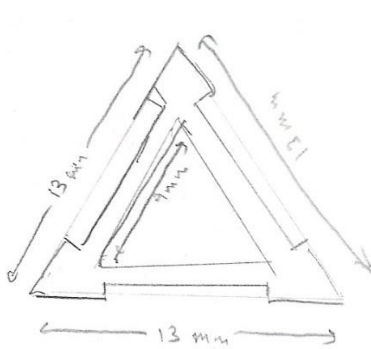
Cube part Sketch



Cube part



Stand part Sketch



Stand part

