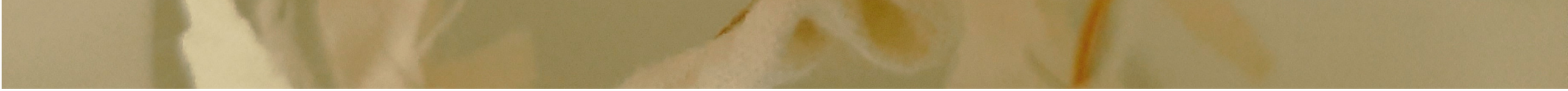
Youling
有灵

MAN ZOU



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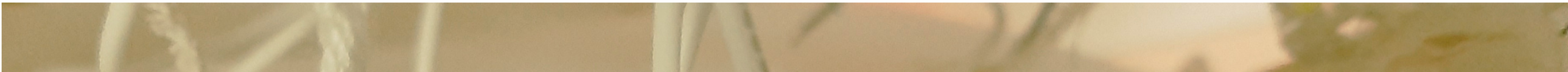


DESIGN BRIEF

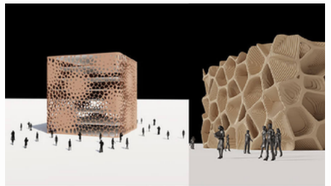
Option 2

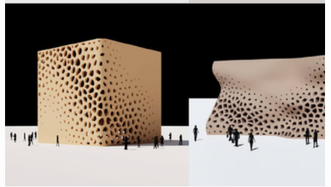
A couple building a family home with a focus on eco-friendly materials and appliances. our objective is to create a product that portrays the visual and sustainable nature of the world around us, inspired by occurring natural phenomenon.

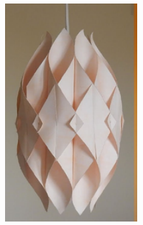
Needs

- Comfort
- Affordable
- Domestic
- Repairable
- Natural Materials
- Sustainable
- Endearing

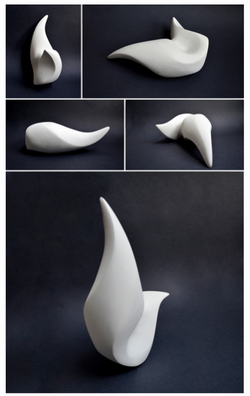
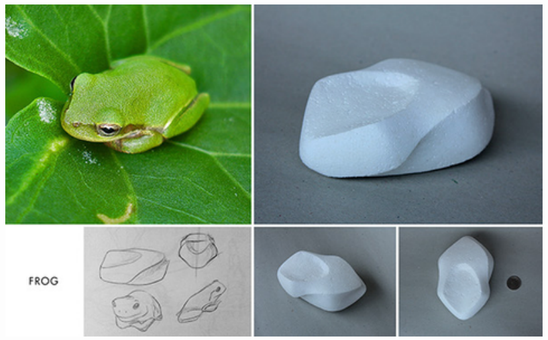
MOODBOARD

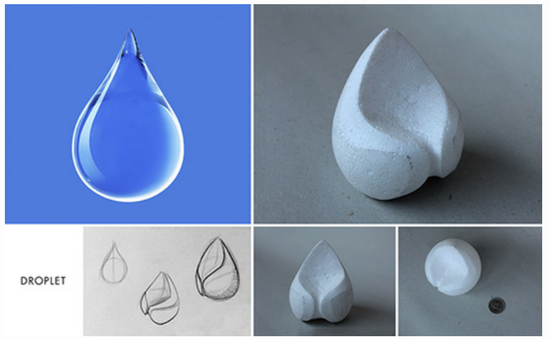










Main Concepts

Voronoid structures, nature-inspired morphology, interactive furniture, sensory experience, thin and organic lamp shades.

LIGHT STUDIES

Environment Cognition

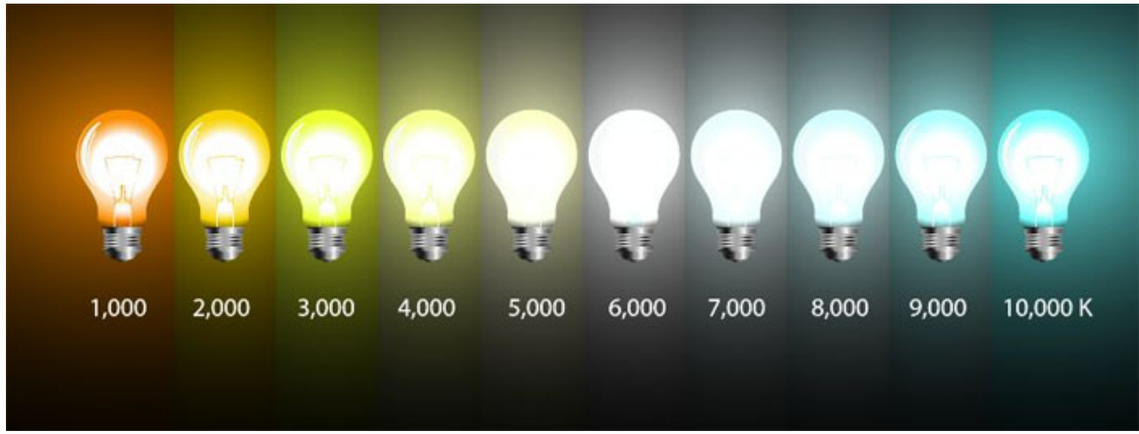
When we are introduced to a new space, our brain tends to associate elements in that space with what we are familiar with from our memory. When an environment feels a certain way, it is because it resembles to something that we have experienced in the past and that we rationally associate with familiarity and comfort.

Properties of Light

Light shapes the environment in two main ways: through brightness and through colour. Studies have shown that over-illuminated spaces can be daunting and can possibly exaggerate emotions. Diffused light works best for humans, as it can reduce stress, and increase productivity. Regarding saturation, deeply saturated colours can be intimidating whereas subtle colours can bring more comfort to mind.

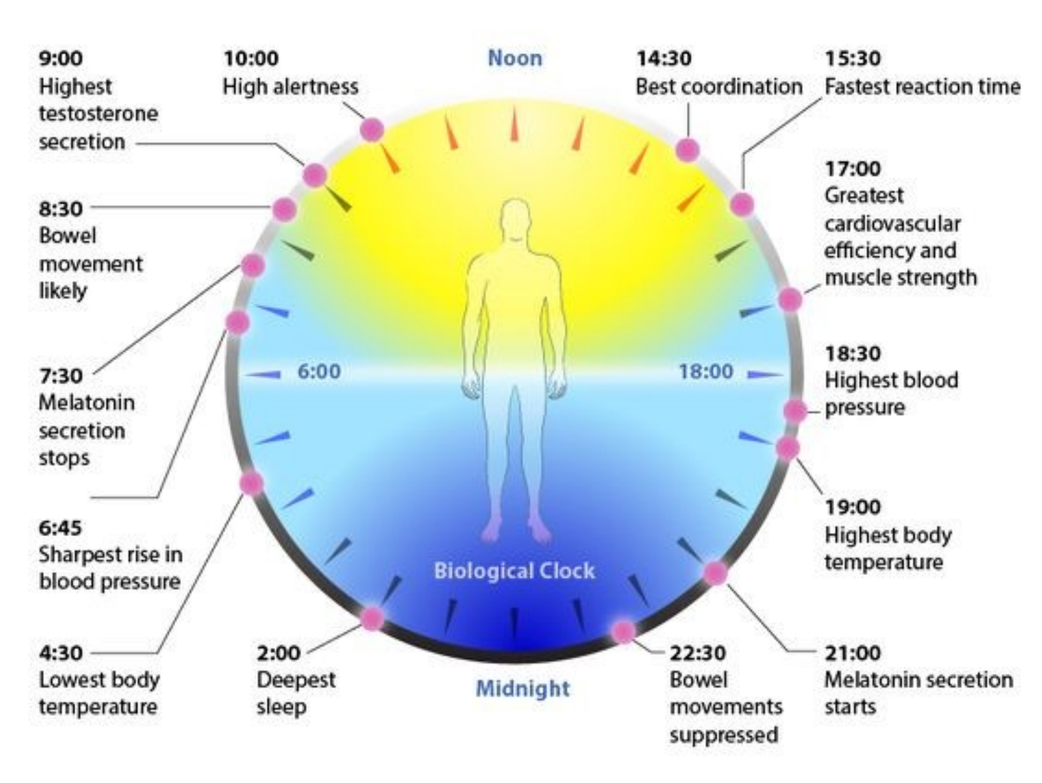
Source of Light

Light directed towards the eyes can cause discomfort, light above our eyes tends to have a certain limitation in the interaction that could happen, and light below our eye level contributes in building an informal ambiance.



Source: Guide to Lighting Colour Temperature, lightingstyle.com

LIGHT STUDIES



Source: Circadian rhythm, woarchitect.com

Conclusive thoughts

In a home setting, in order to bring comfort and emotional attachment (which are the goals of our team and the needs of the client), we could consider using ambient light intended to be placed under eye level. The light should be soft, and should balance well with the aesthetic of traditional home setting.

STUDIES ON PLAYFULNESS, NATURE AND COMFORT

Interactivity

Pleasant or intuitive interactions with objects increase the emotional connection to the object, thus avoiding a psychological form of planned obsolescence.

Psychological lifespan of an object is one consideration in waste reduction. In Eternally Yours the authors note that the storytelling aspect of an object plays an important role in creating an attachment between the artifact's owner.From this we can conclude that the communicative quality of an object directly affects its psychological lifespan.

Well designed objects are physically durable and can also create a lasting relationship with its owner. This may be further encouraged if the owner is able to manipulate and repair an object, effectively giving them agency over the object and its role in their space.

Natural Connections

Our fast-paced lifestyle is leading to a global increase in anxiety and stress. Research findings from Harvard Health suggest that exposure to nature has a significant impact on our overall health and cognitive functions. Walks in nature can decrease the levels of Cortisol released when our body is stressed. An elevated cortisol level creates an imbalance that directly impacts our health, increasing anxiety and depression, heart diseases, impairing our memory and cognition.

Having natural materials and elements associated with nature can improve the sense of well being in a space. Natural materials are, on the other hand, durable and biodegradable.

Natural materials such as wood, paper, and fabric are locally available and can be biodegradable.

MATERIAL STUDIES ON WOOD

Wood Types (from soft to hard)

Chipboard: manufactured wood, made from wood chips and shavings that are bonded together with resin. It is a dense wood and is commonly used with a veneered surface which is used for flat-packed furniture and work surfaces.

Fibreboard: inexpensive manufactured wood made from the breaking down of hard or soft woods into fibers which are then bonded together with wax, resin, and heat to create a dense piece of wood.

Plywood: strong manufactured wood as it is a build-up of layers of wood veneers that are bonded together to create a flat smooth sheet of wood. It has good strength and resistance to warping due to the bonded cross-ply construction.

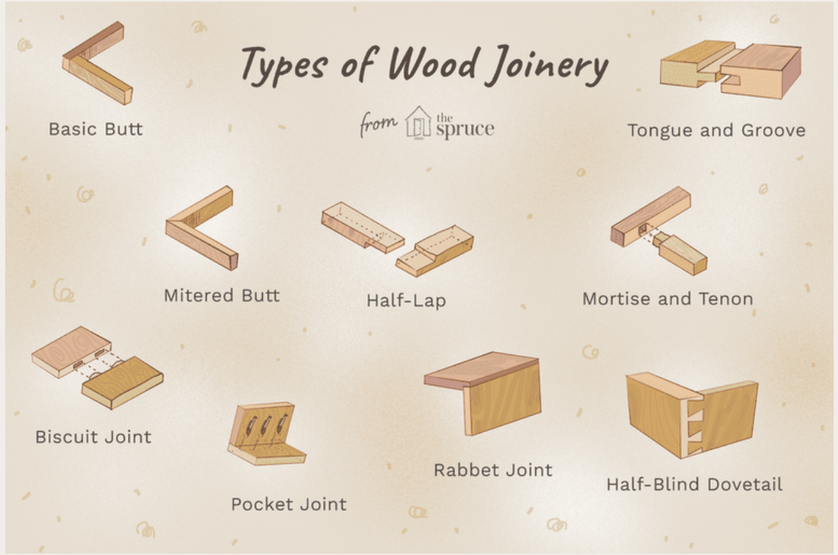
Pine: softwood with a pale finish, less durable compared to other hardwood.

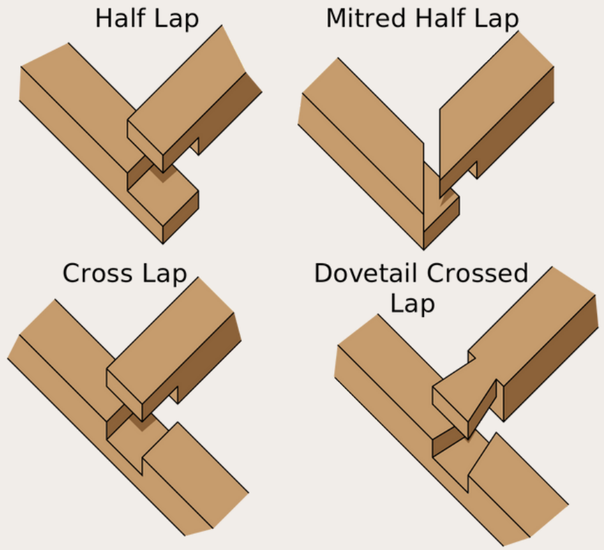
Beech: a hard, strong and heavy wood. It has a fine, tight grain and even texture. Beech wood is very light in colour and has a high shock resistance. It is a popular wood for furniture.

Ash: a tough hardwood that is known for its excellent bending abilities. It is primarily used for bent pieces of furniture such as a chair with curved backrests. Ash is light brown in colour with a straight grain.

Source: Wood Types, furniture123.co.uk

STUDIES ON JOINTS





Joint Types

Butt joints connect the two ends of a material together with glue, screws or nails.

Tongue and groove joint – one piece fits into the other at each end. Very strong but has to be cut exactly to fit.

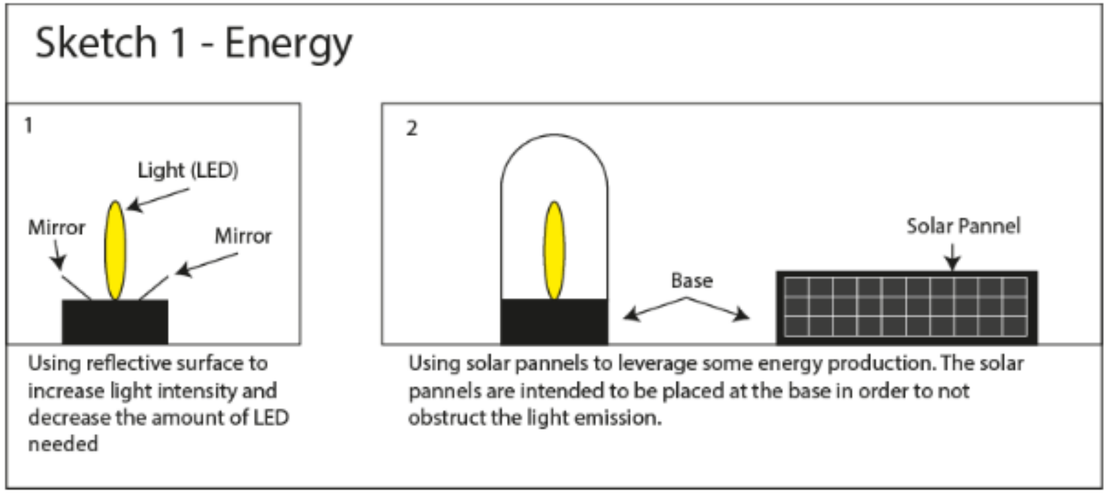
Biscuit joint – has a thin but wide tab on one piece and a slot on the other to fit in tigtly. Must be cut consistently.

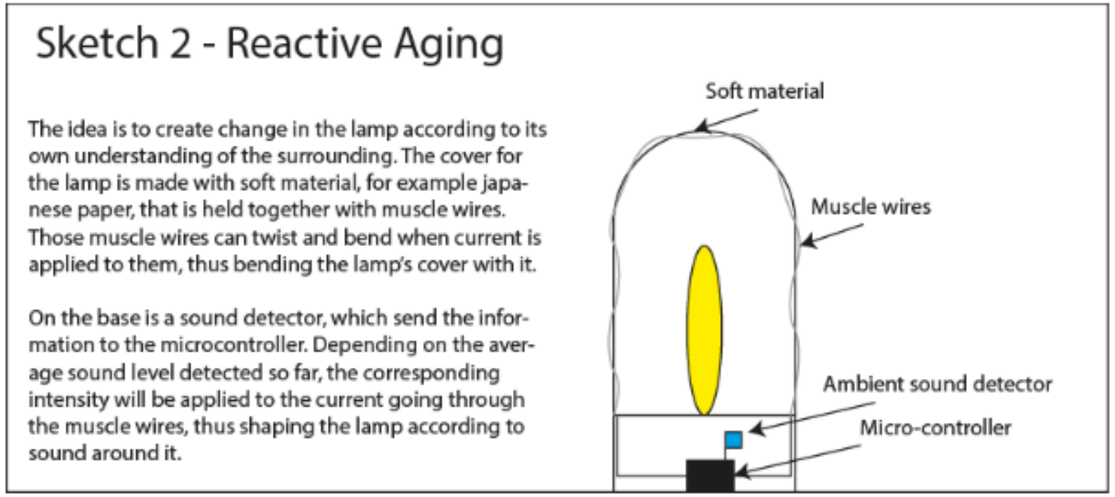
Box joint – has a satisfying look, row of square tabs that connect to the other piece that has the squares in the opposite spots. Fits into each other seamlessly. Very strong hold.

Sliding dovetail joint – slide tab piece into cutout piece for a secure hold. Could use this method for the bases of the plexi-glass card stands.

Source: The Spruce Crafts, oxfordwoodrecycling.org.uk

INITIAL SKETCHES





General Design Goals and Directions

I decided to focus on the themes of emotional attachment and energy efficiency to develop my lamp. In what concerns the influence of psychological connection with a product on its life span, I believe fast consumption has an effect on the way we view products. Most of the items we purchase are designed to age, and in most cases, old age means rejection. I would like to reflect for my project on the aging process of a commodity (in this case, a lamp), to see how this evolution process reflects its past and projects the future.

I am also interested in exploring the influence of an object's lived experience on us: how we shape and are shaped by our commodities. How can we foster positive long-lasting attachment with our objects? For this, my initial idea is to design a lamp reactive to its environment and that can learn to transform itself according to its understanding of its environment.

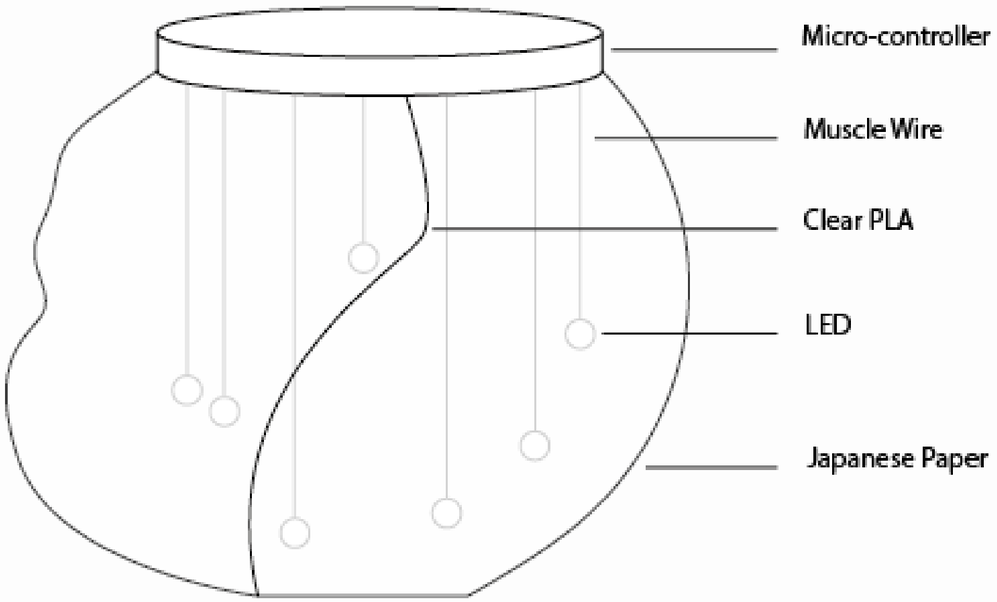
CONCEPT

The majority of home furniture is essentially produced for its functional purpose. The aspect of emotional connection will only be considered if it can fulfill its function.

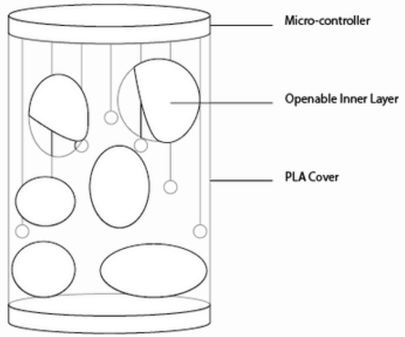
What if a thing's reason to exist is not limited to fulfilling an assigned function, but rather exists as an entity that embodies a past and projects to the future? When a thing can learn to transform itself according to its understanding of its environment, it becomes a carrier of memory just like us.

With YouLing, the creation aims to reflect on how the existence of our home furnitures can be shaped by our interactions with them, and in return, influence us through their response to those interactions.

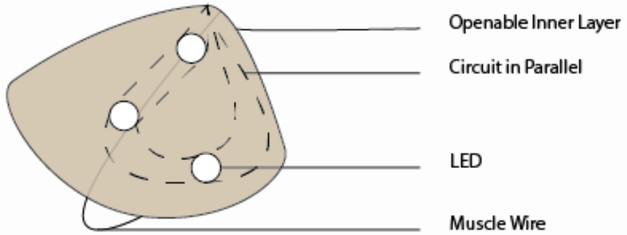
SKETCHING



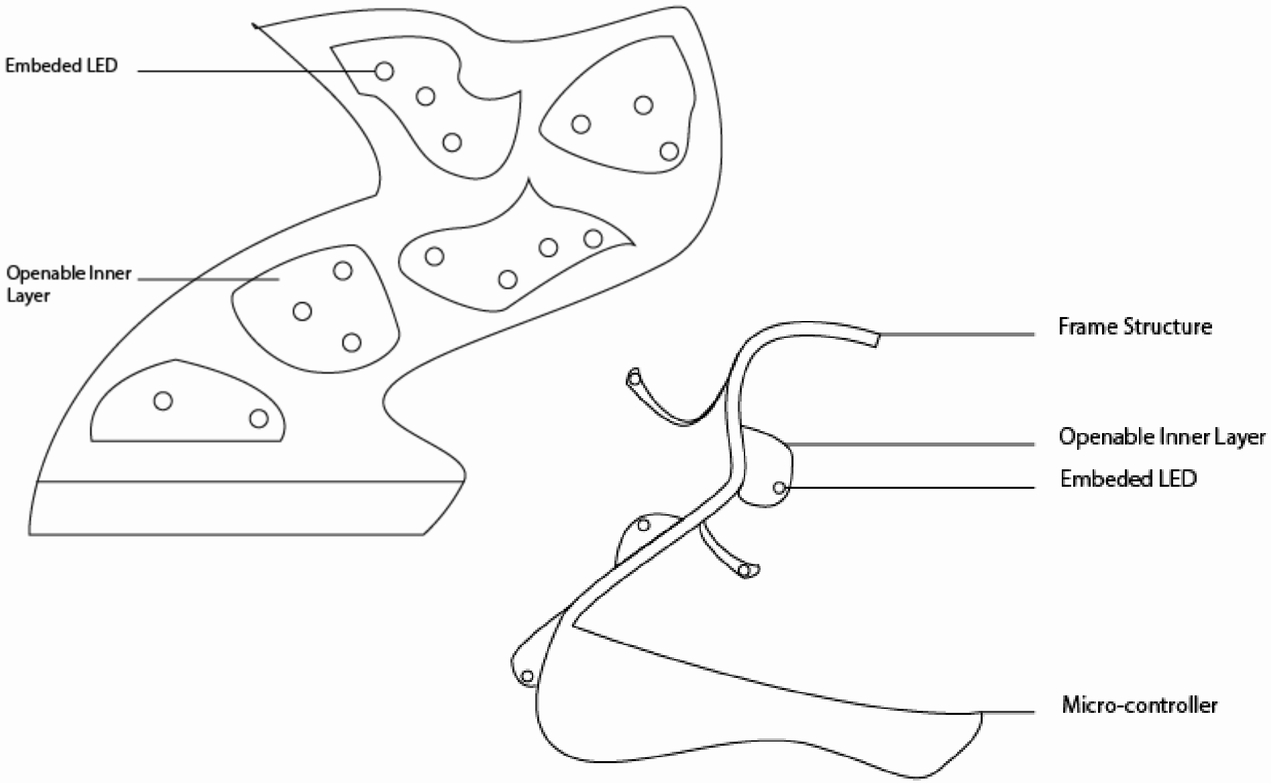
01 In this first idea, the muscle wires are pulling the LEDs up and down, thus creating dancing lights inside the lamp shade that is half 3D printed and half produced in Japanese paper.



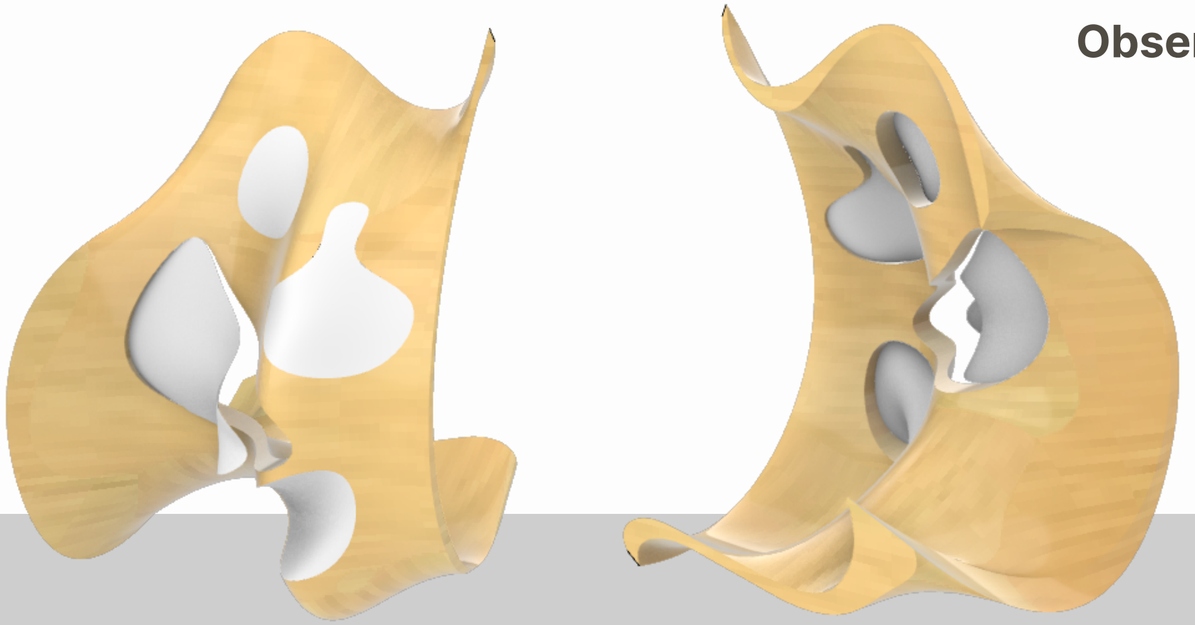
SKETCHING



02 In this other idea, the LEDs stay in place but the cavities are moved open and close by the muscle wires.

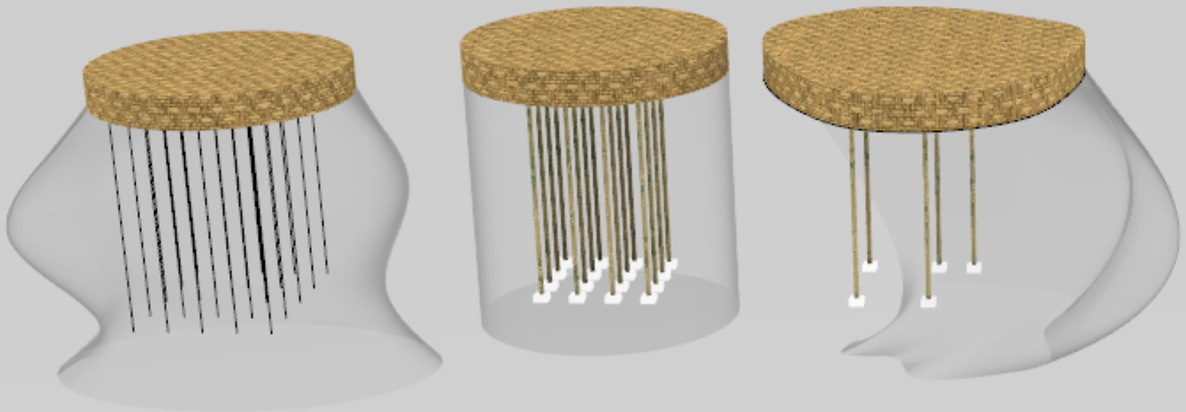


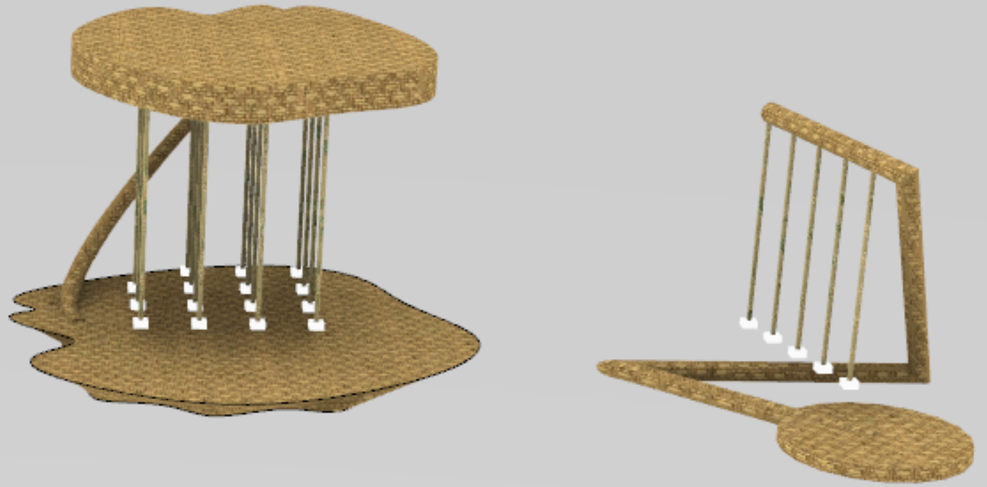
EXPERIMENTS WITH SHAPES AND VOLUMES

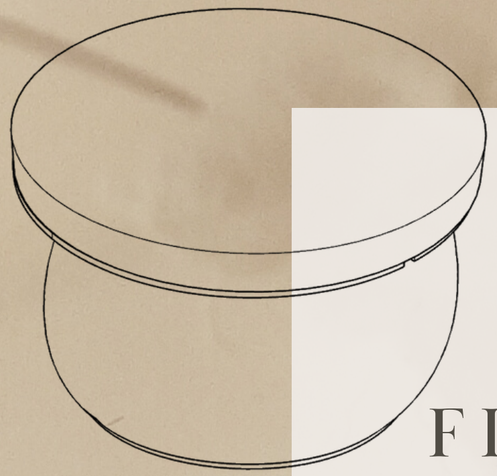


Observations

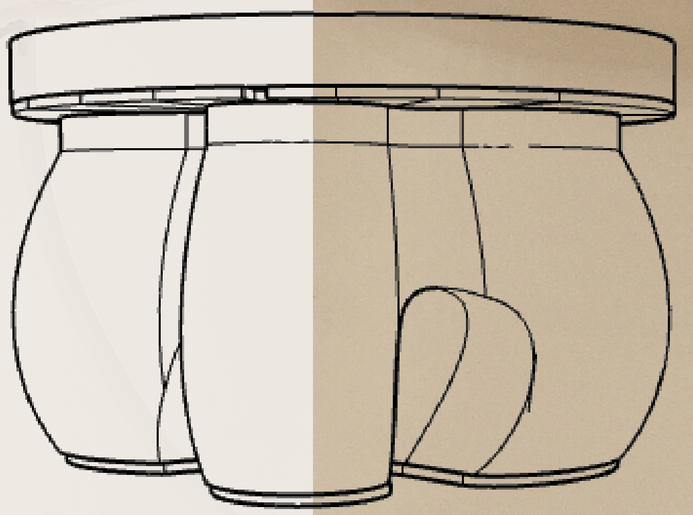
Although the suspended version has more room for creativity and more interesting composition, electrically speaking they are uneasy to deal with, as the muscle wire and LEDs need power and ground connections, which can result in too much wires. Thus, I decided to go with the container idea.





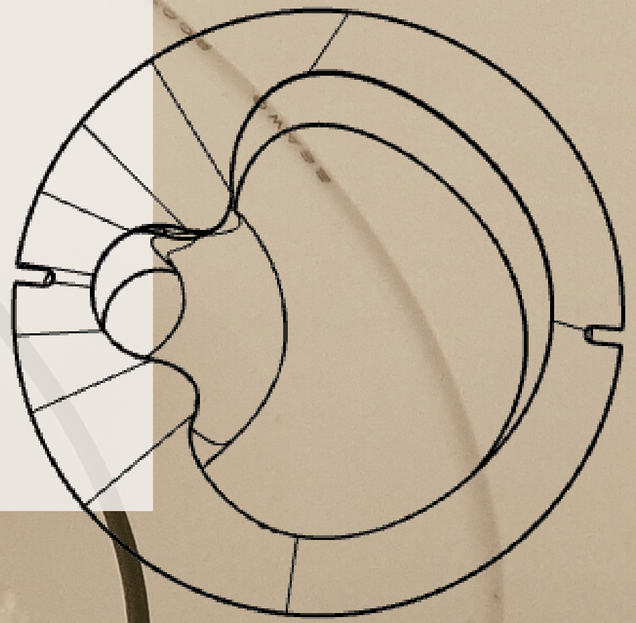


FINALIZED SKETCHES

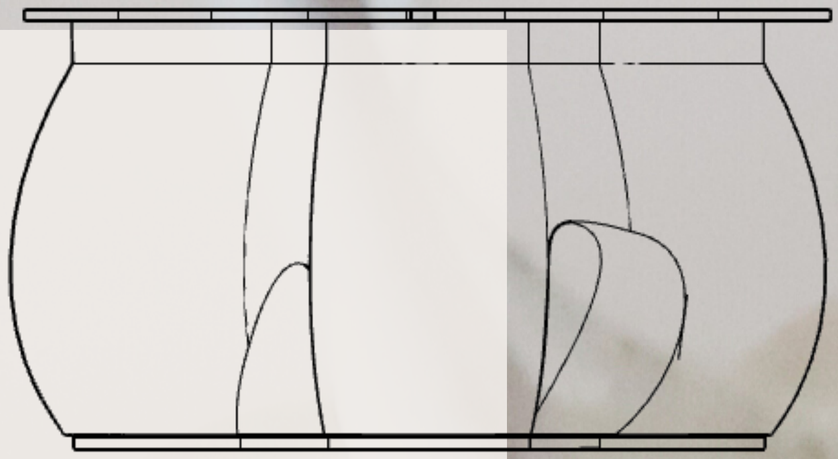


Concept sketches 1 and 2 are combined to create a rounded lampshade that contains moving muscle wires inside. The muscle wires are pulling on some shade-casting structures instead of the LEDs.

The structure contains 2 main parts: the wooden top and the PLA lampshade sandwiched by the top pannels.

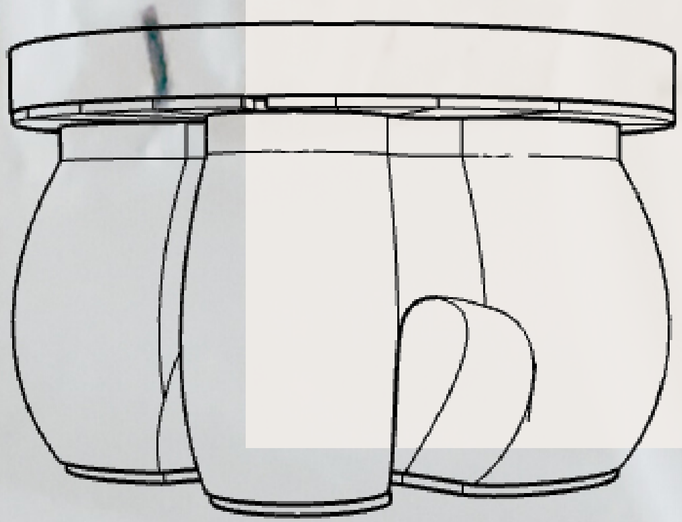


FORMS



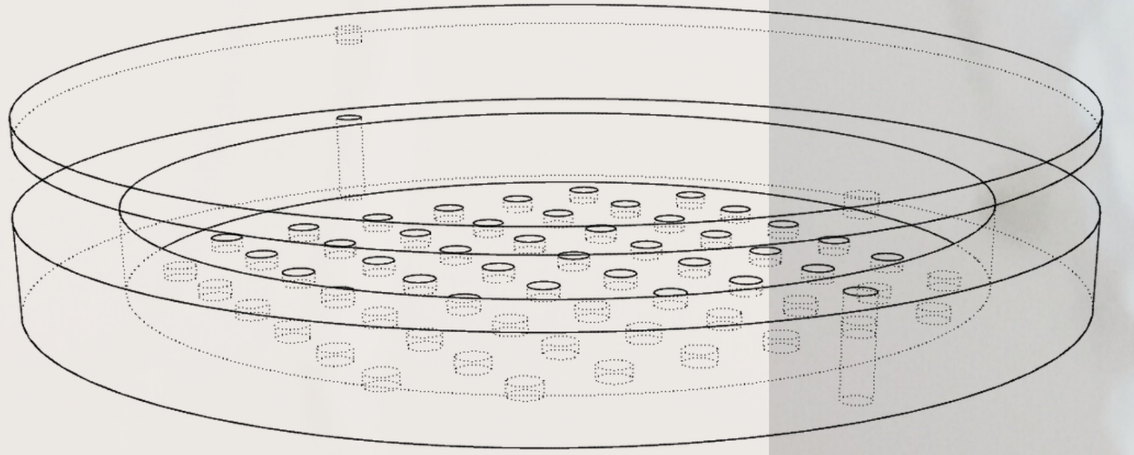
Lamp Shade

The lampshade is designed to resemble a tree trunk and root branching. This is to give a soft cognitive association to nature, which can help calm anxiety that we are exposed to in our daily life.



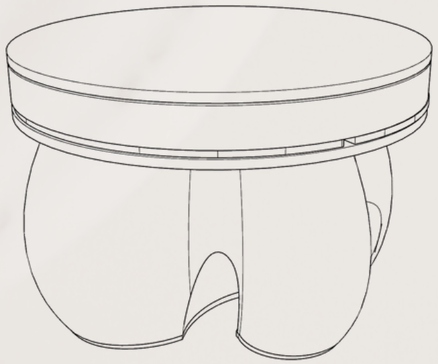
It also goes with the theme of my project, which is "aging". The aging of our commodities is like the growth of roots: they are not as noticeable, but their influence changes and persists.

FORMS

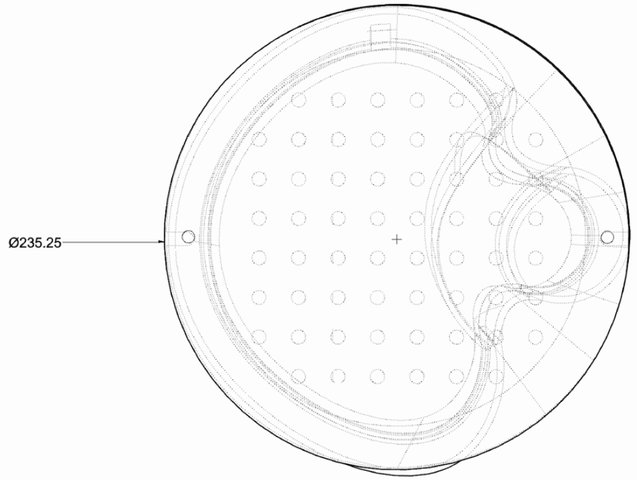


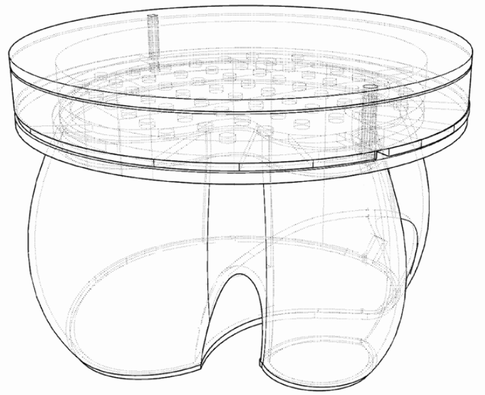
Lid

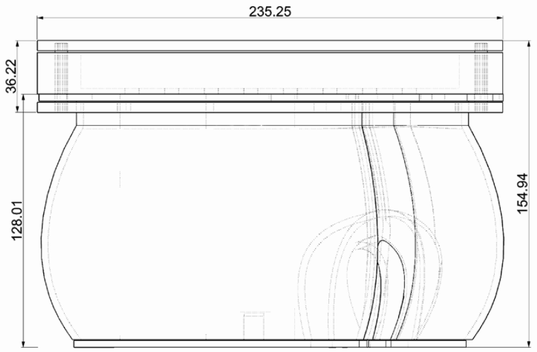
The lid is planar to diminish the space the lamp is taking by offering the lid as the continuation of the table surface the lamp is on. In this way, the space taken by the lamp is still available so that books, keys or phones can be placed on top.

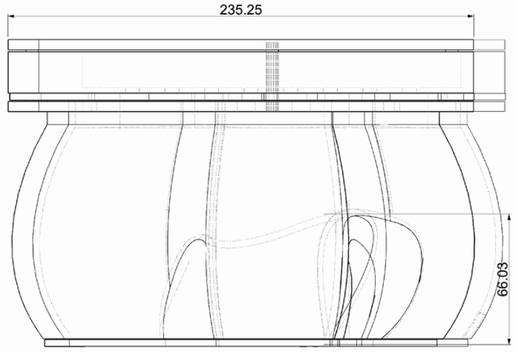


As the lamp is designed for the home setting, I believe the use of space is an important topic to be considered.









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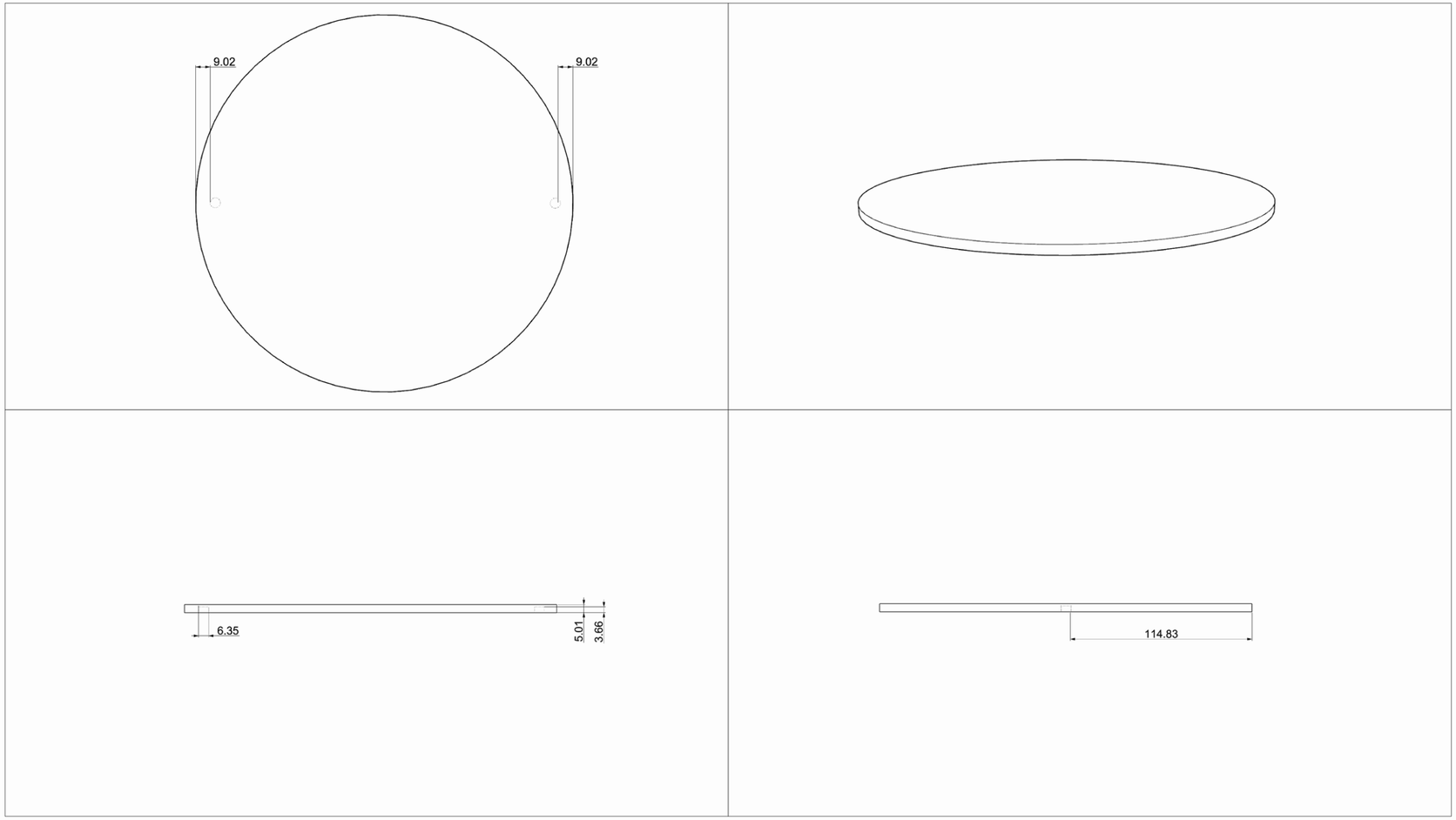
Unit: milimeters	DART 477



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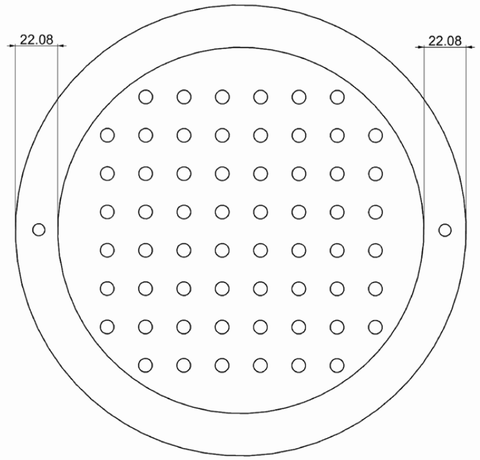
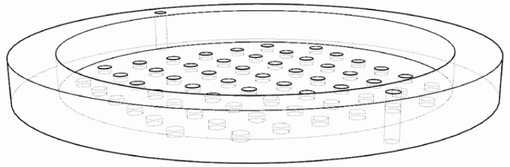
Unit: milimeters	DART 477





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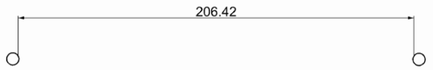
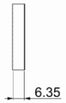
Unit: milimeters	DART 477





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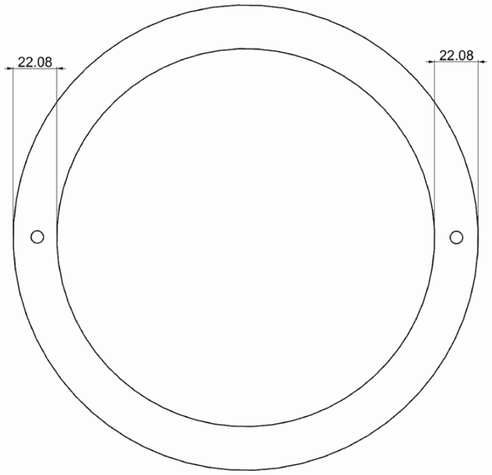
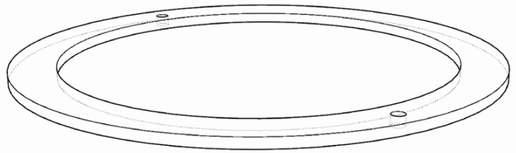
Unit: milimeters	DART 477





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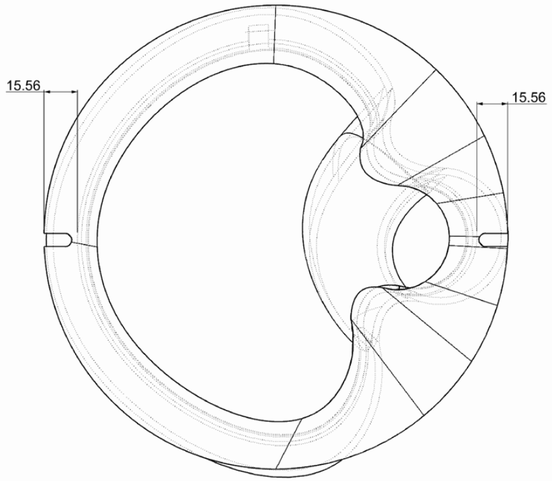
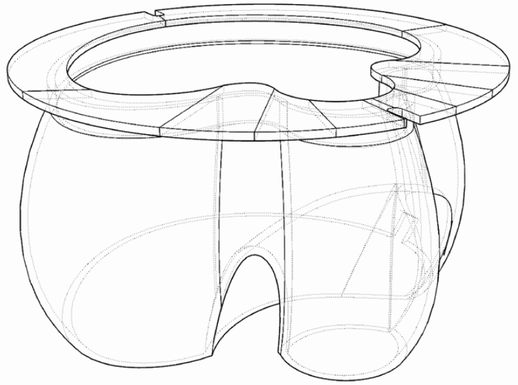
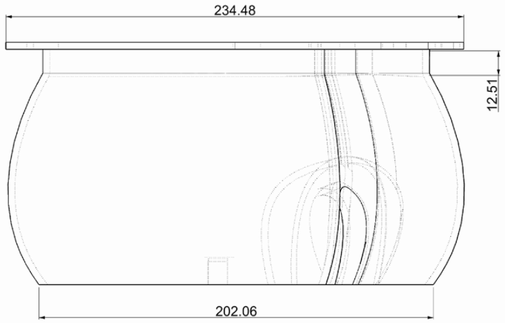
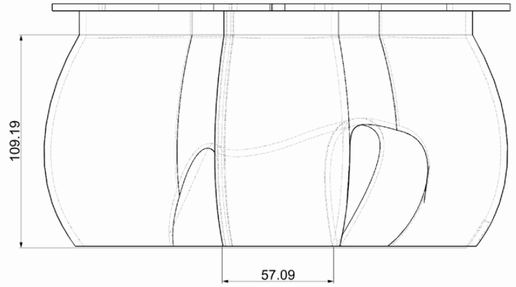
Unit: milimeters	DART 477









Name: Lamp Shade 3D Print	Date: 2022-08-12
Unit: milimeters	DART 477

PRODUCTION

In order to produce a workable project, my strategy is to start with the circuit building. Once I know the structure of the circuit, I can adjust the structure sizes for the top part and the bottom part.

1: Electronics

The electronics phase aims principally to get a functional circuit and fluid code.

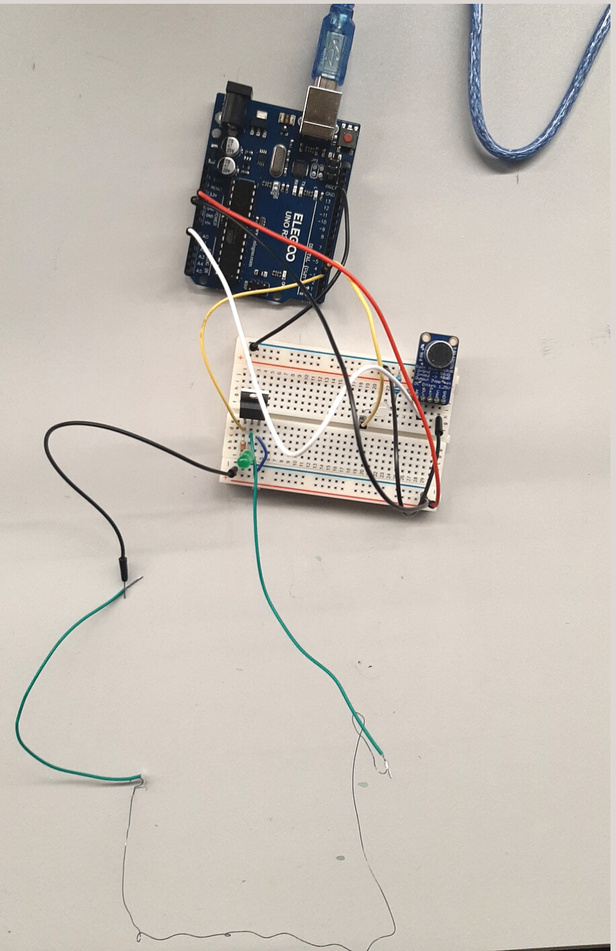
2: Wooden Top

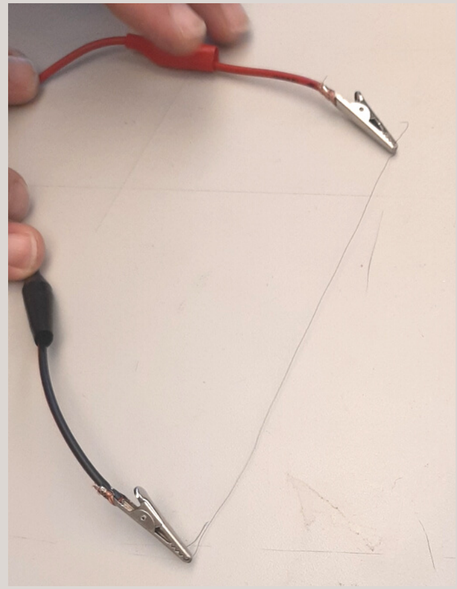
For the top, I decided to use only wood both for durability reasons and weight reasons.

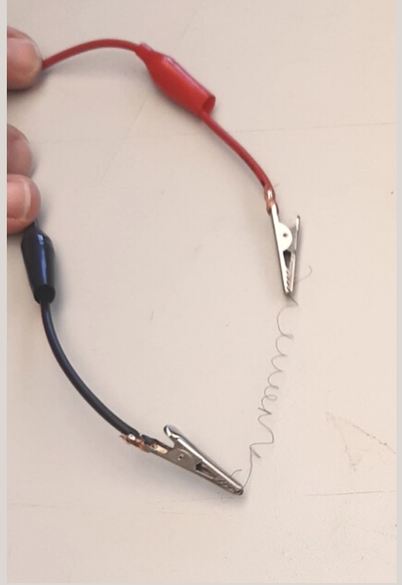
3: PLA Shade

The lamp shade is made of 3D printed PLA at 3mm thick. The printing process went through a few variations.

ELECTRONICS







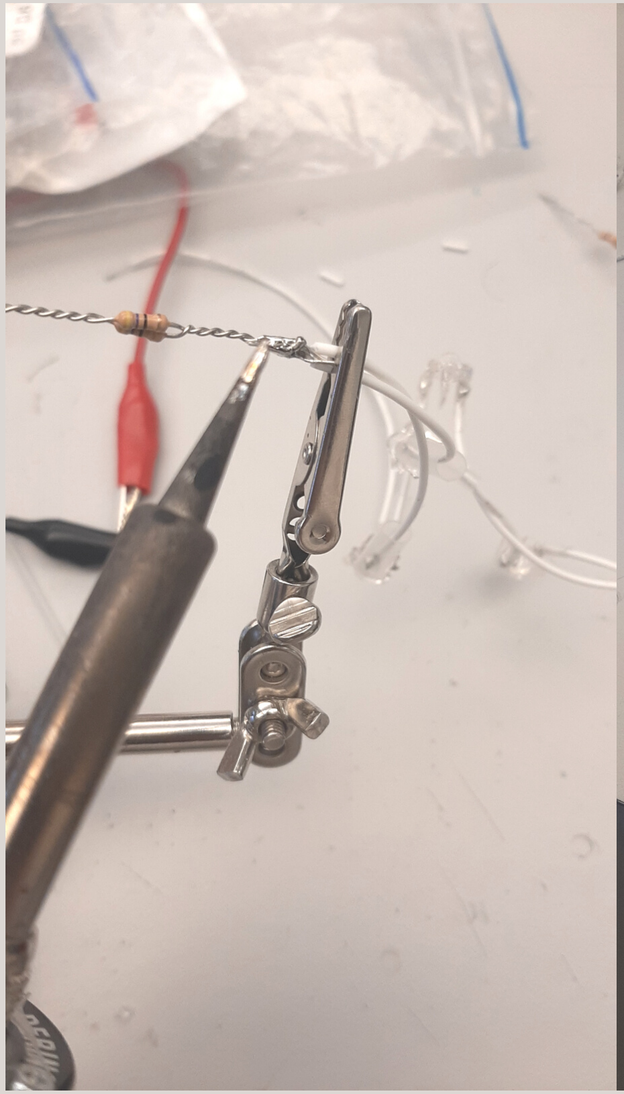
First, several experiments with the muscle wire's behavior to heat were made. Heating in boiling water, on heating plates, and on blow torches were tested to finally arrive at the optimal heating method: a hot air gun, which gives the best results when training the wire.

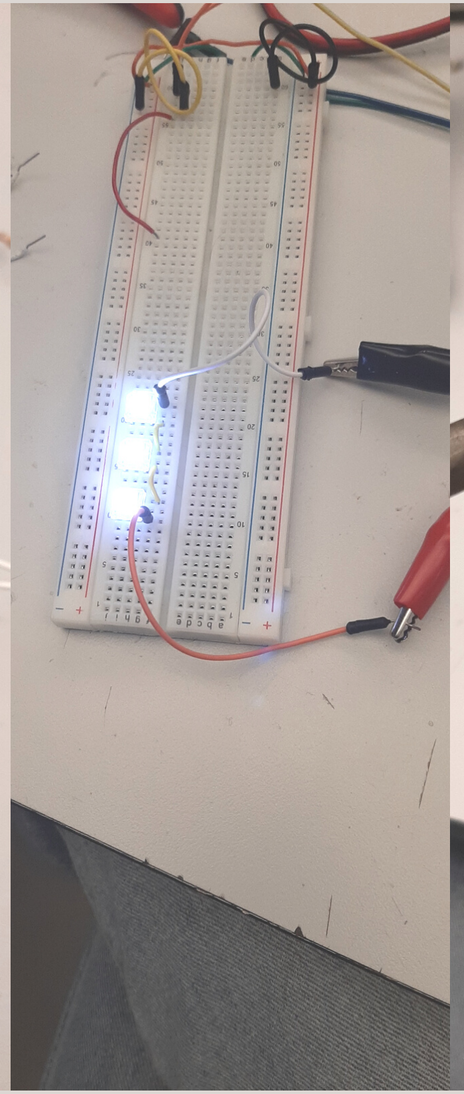
I then followed up with voltage testing and thickness testing. The result shows the best reactions happen between 4V to 5V at 700 mA.
As the micro-controller would not be able to supply enough current to the muscle wires while running the LEDs, I had to add another power source of 8V and 4A.
To control the muscle wires, I used PWM coming from Arduino on the mosfet.

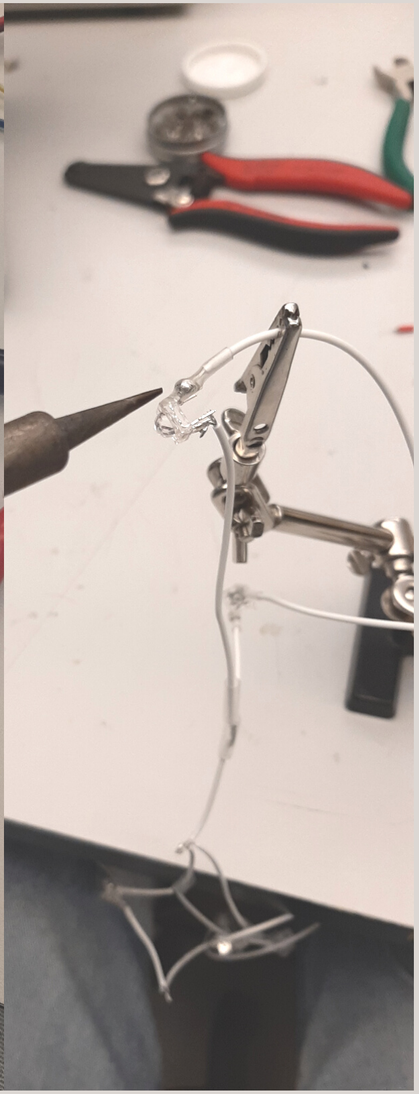
ELECTRONICS

For the LEDs, several different types of LED were tested, including neopixels, chip-boards, lilypads, and piranha LEDs. I decided to use piranha LEDs for their low voltage (3.3V) and current consumption (low wattage), and its uniform brightness spread.

In the prototype, only 3 LEDs are used and were powered from a battery. As this structure does not give enough light, I added 9 more LEDs in the final circuit and powered them from the power source of the muscle wires instead. The LEDs are paralleled with some in-thread in-series LEDs, which guaranteed a voltage consumption of 8V.

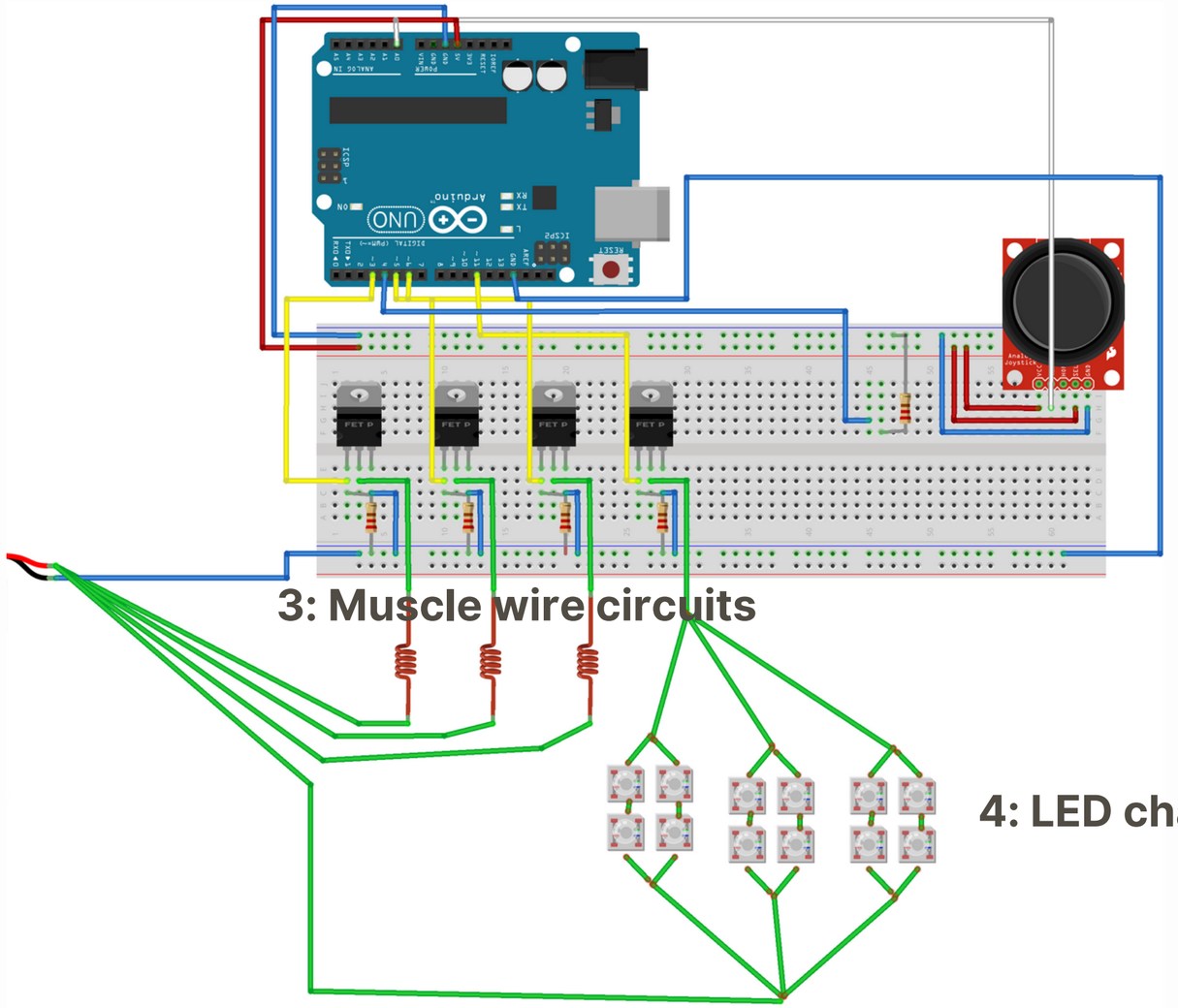


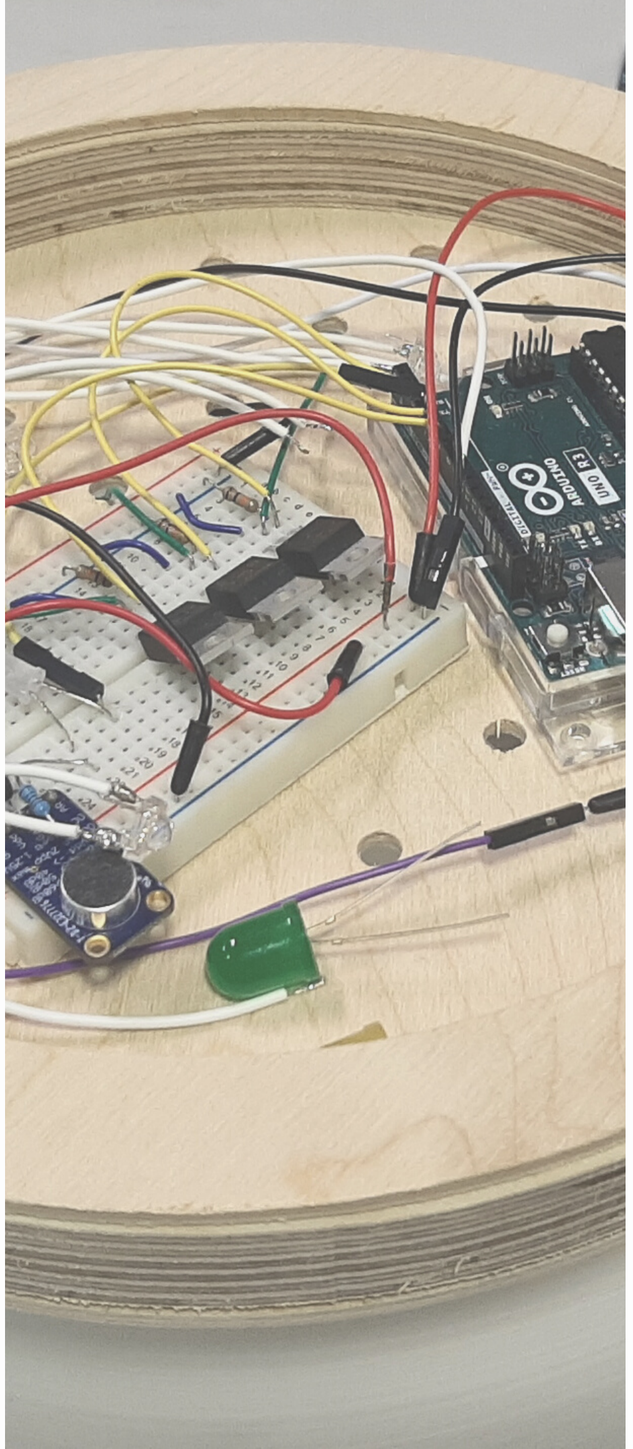




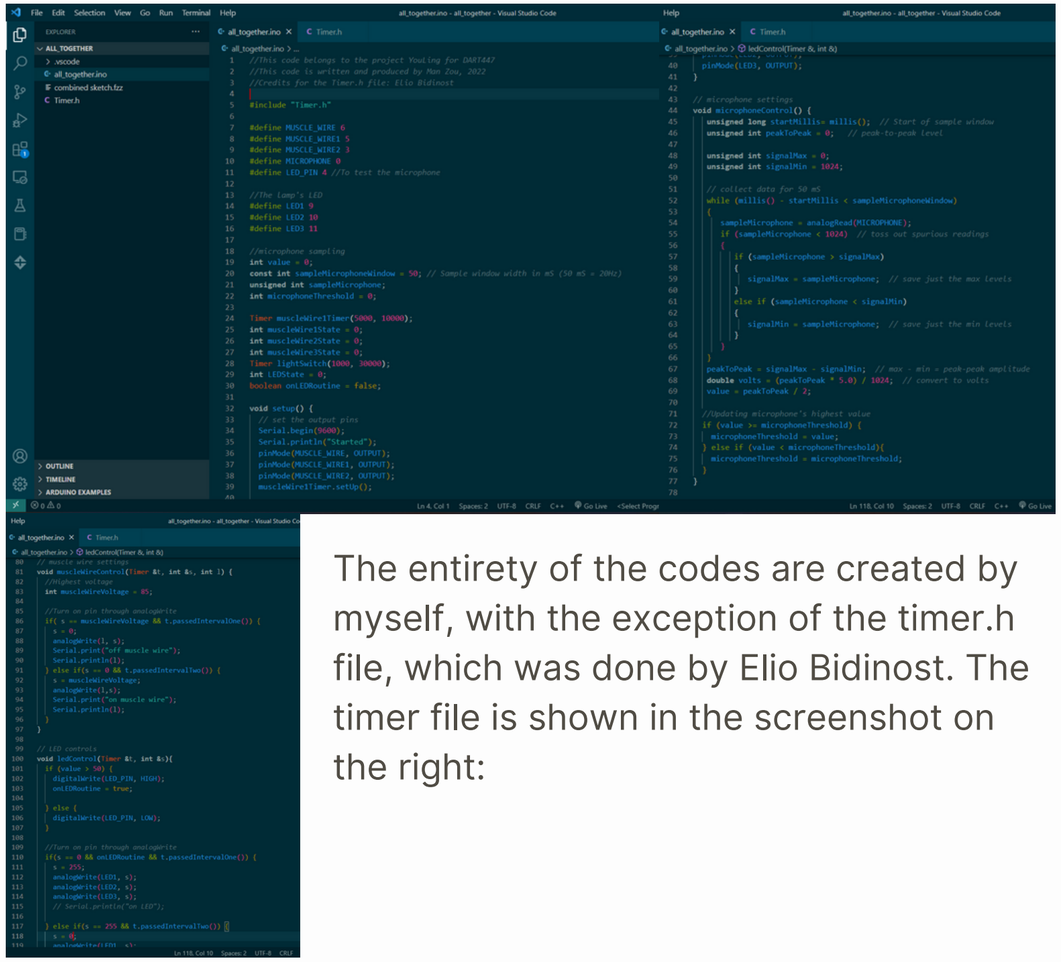
FINAL CIRCUIT WIRING DIAGRAM

2: Arduino Uno

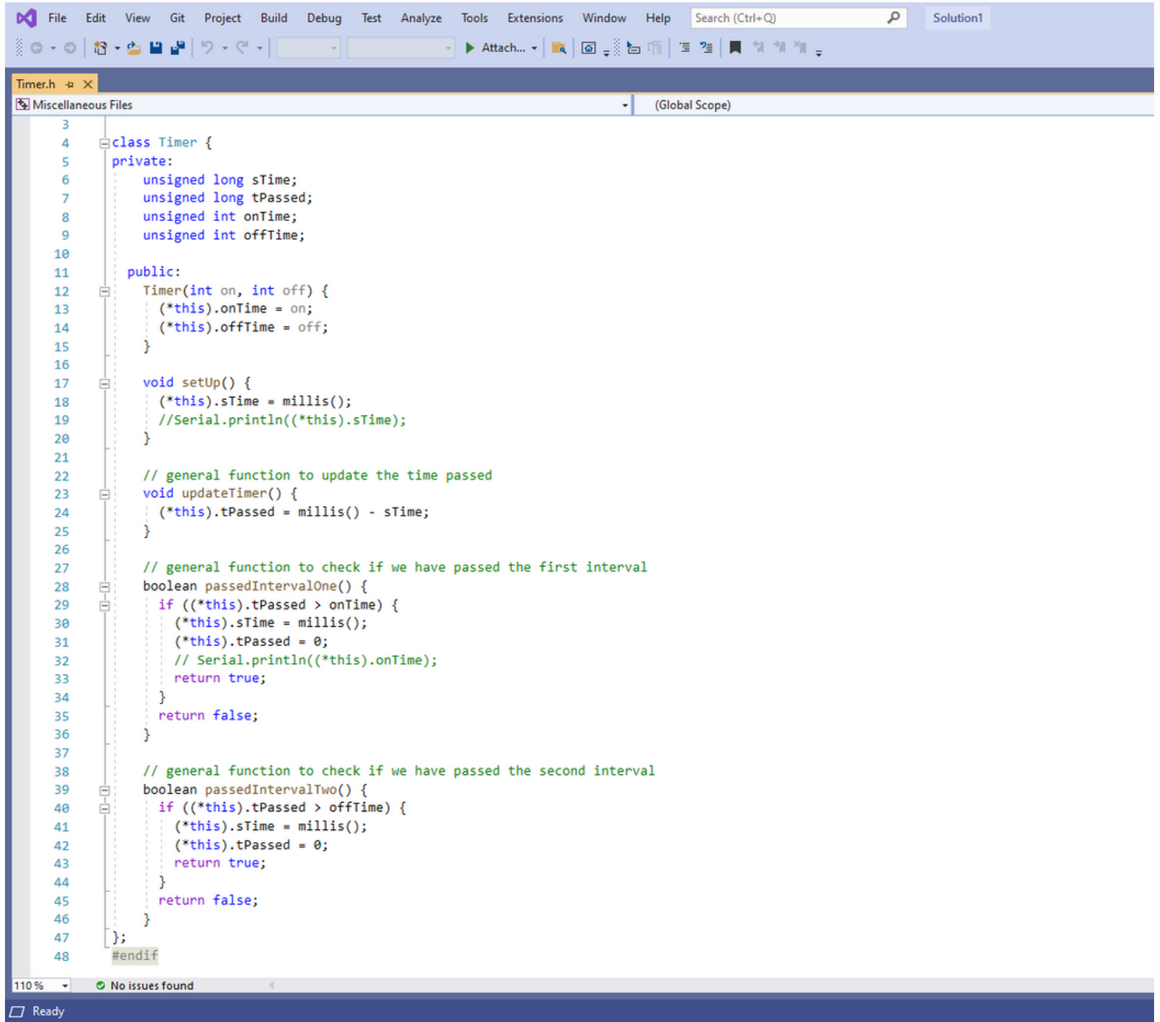




CODES FOR ARDUINO



The entirety of the codes are created by myself, with the exception of the timer.h file, which was done by Elio Bidinost. The timer file is shown in the screenshot on the right:

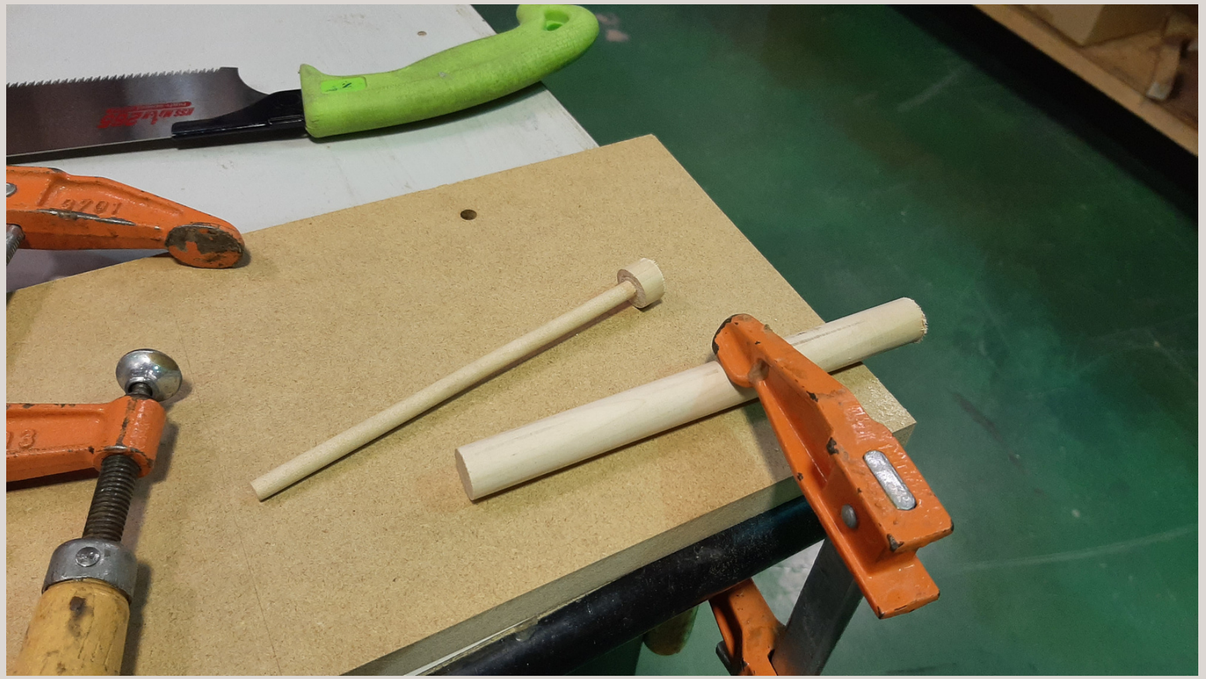


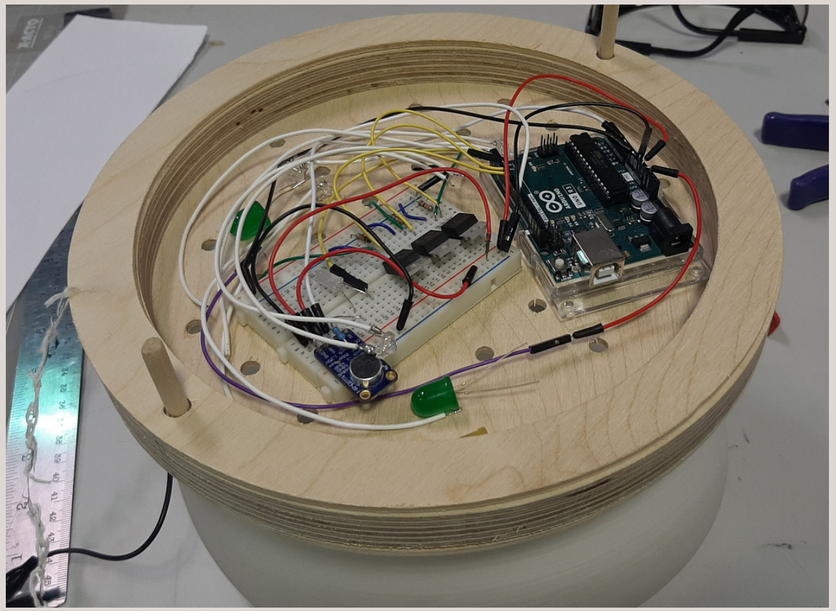
WOOD

For the wooden part, 5 circles were cut using the CNC machine, among them 3 circles are rings. I then assembled 3 pieces to make it have the form of a container. 2 other pieces are left for the lid and for holding up the bottom part.

Fish glue was used to put the wood pieces together.

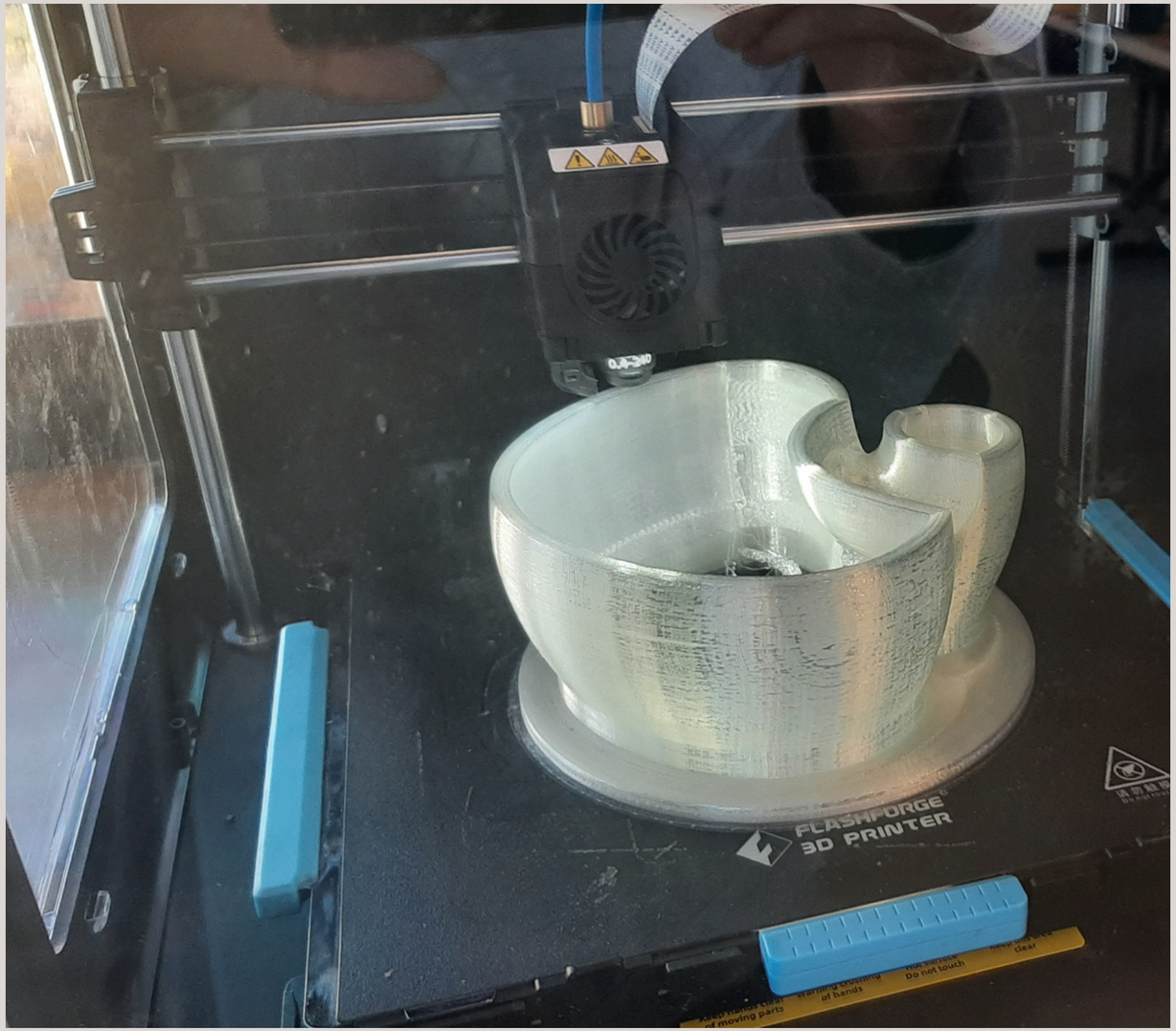
The pieces are joint together by dowels, which are made to fit tight on the rings.





3D PRINT

3 prints were made during the whole process. The 1st one was intended for the 1st prototype, however it did not get made as there were some printing difficulties. The second one (on a small scale) was made immediately after to test how the printing would work for the shape I want.
Finally, based on the second printing, the final lamp shade was printed, with adjustments in thickness and details.



Process photo of prototype 2.

ASSEMBLY & PROTOTYPE 2

In the assembly phase, small wooden rings were used instead of the actual in-scale rings to allow room for future adjustments if needed, as using the actual rings will require the wood pieces and the dowel to be glued together.

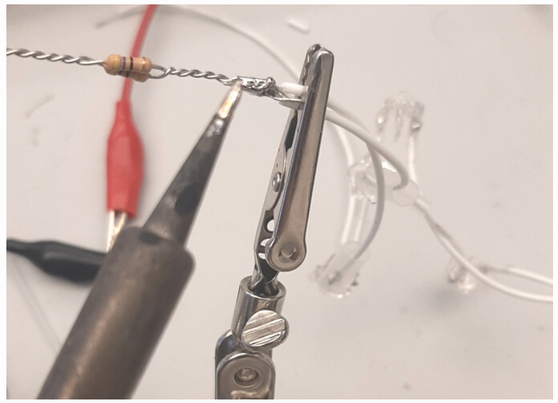
EVALUATION OF PROTOTYPE 2

Battery: the battery I used for prototype 2 was not stable, and could not support the proper functioning of the LEDs and micro-controller.
Movement: due to the lack of support structures for the muscle wires, the internal structure was barely noticeable, as they were too far away from the lampshade.

CHANGES AND IMPROVEMENTS

In the prototype, only 3 LEDs are used and were powered directly from the microcontroller. As this structure does not give enough light, I added 9 more LEDs in the final circuit and powered them from the power source of the muscle wires. The LEDs are paralleled with some in-thread in-series LEDs, which guaranteed a voltage consumption of 8V.

Instead of the battery, I replaced the power source with the power cable, which can be plugged on electric outlets



Another lid was also made, with cleaner treatment to details.

Aside from this, I replaced the wooden thick dowel rings with thiner and on-scale rings, and glued the dowels in those tings with fish glue.

FINAL PRODUCT

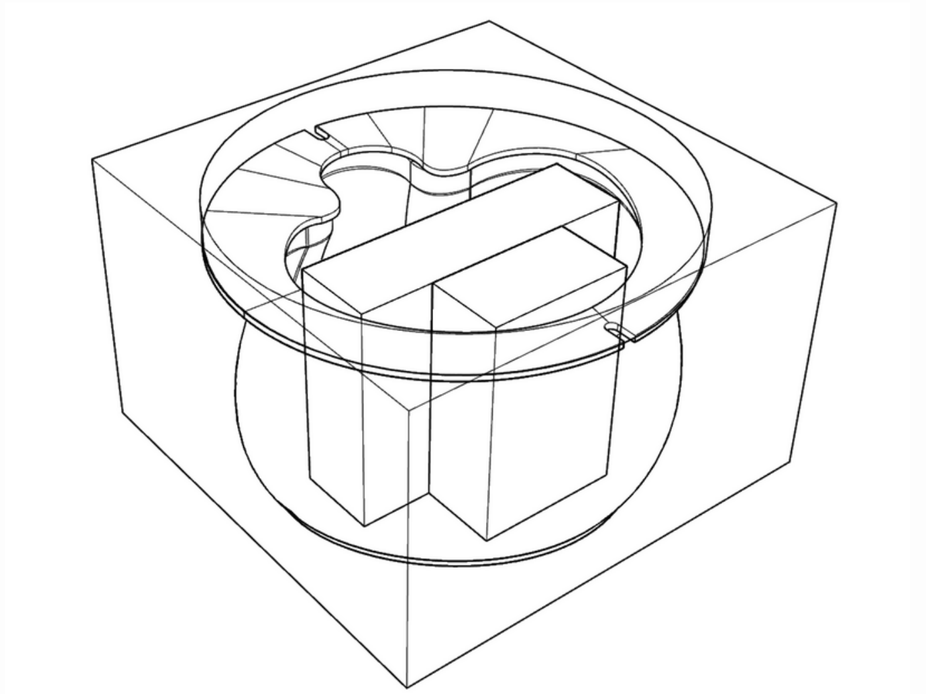
PACKAGING

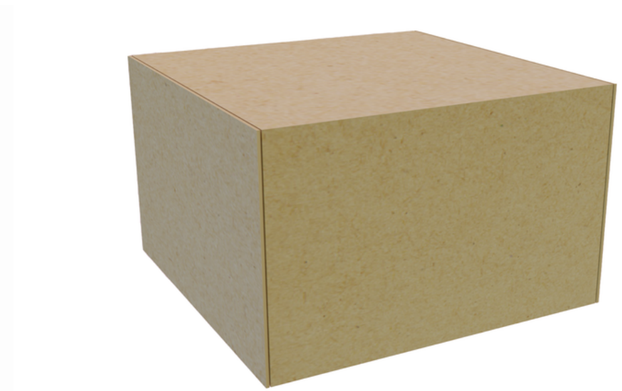
Packaging

Recyclable non-printed cardboard box.

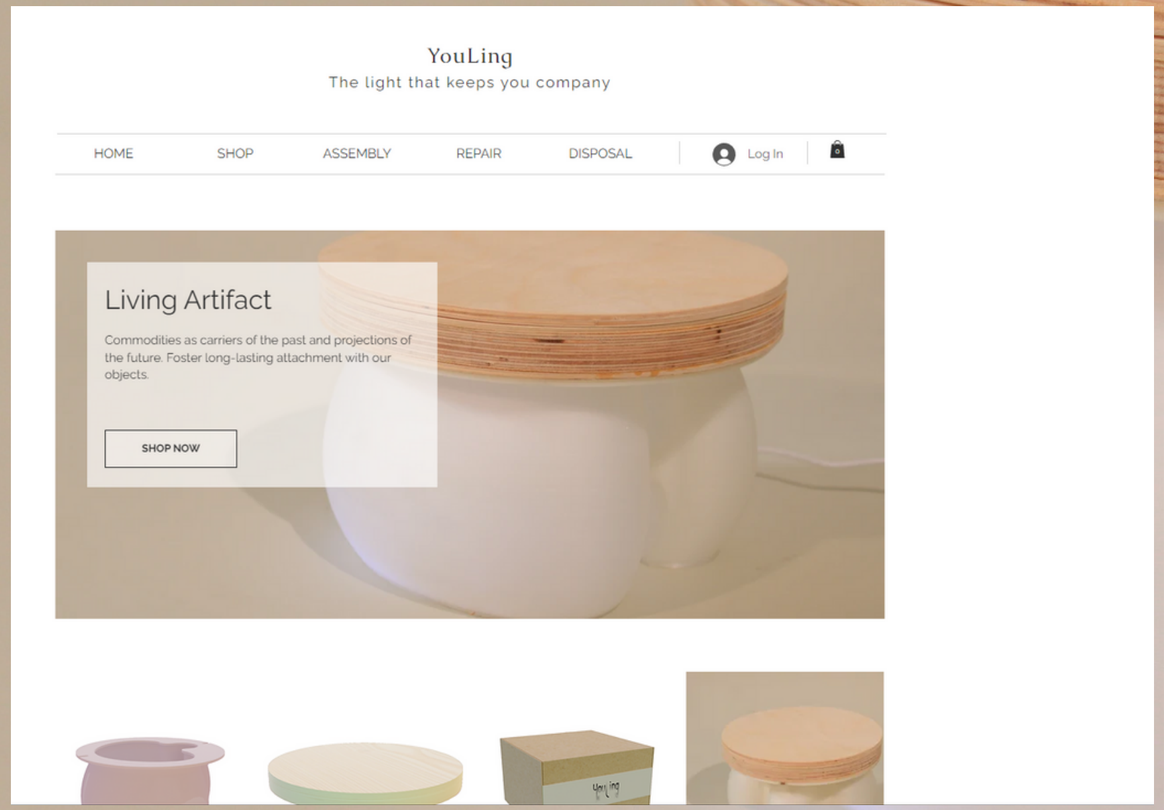
The box can be flattened and stored for future use.

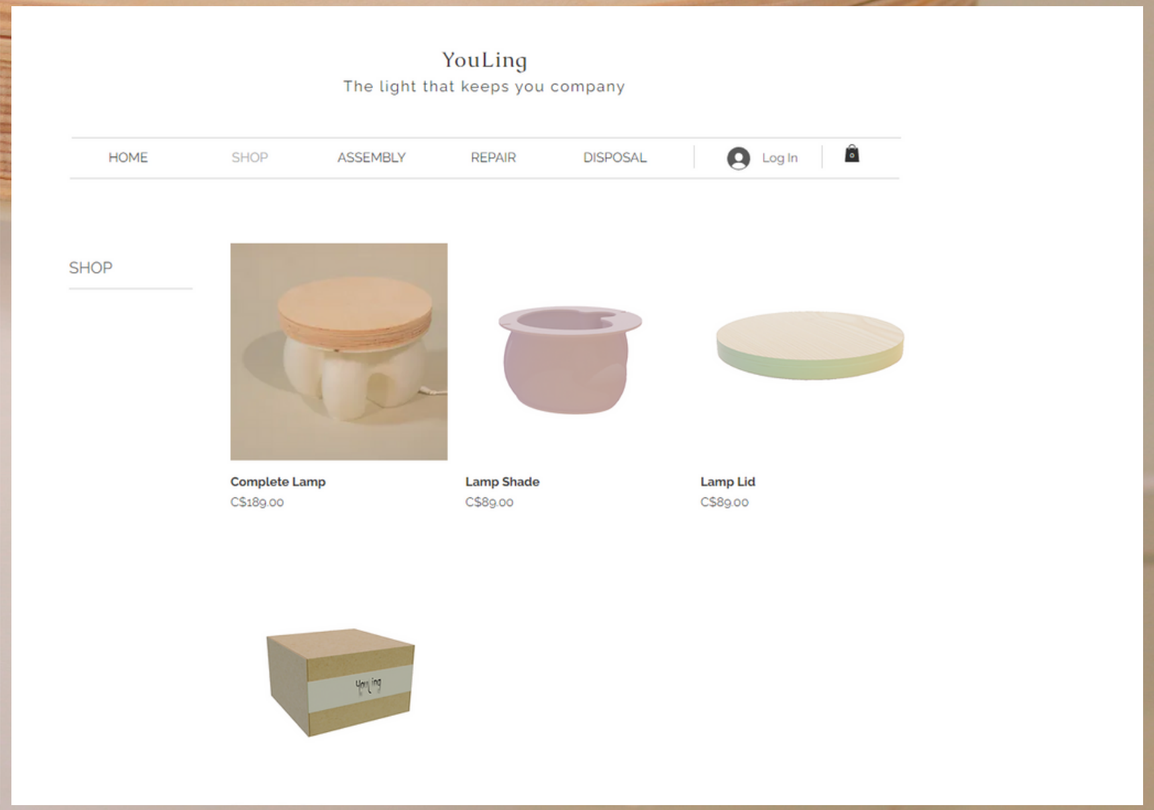
The product's website printed on the other side of the packaging paper.





PRODUCT WEBSITE





PRODUCT WEBSITE

YouLing

The light that keeps you company

HOME SHOP ASSEMBLY REPAIR DISPOSAL Log In

ASSEMBLY

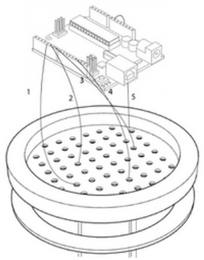
The lamp comes in 3 parts: the electronics, the lid, and the lamp shade.

- Electronics
- Lamp Lid
- Lamp Shade

ASSEMBLY

Step 1: Insert the wires from the microcontroller in the following fashion ...

Read more



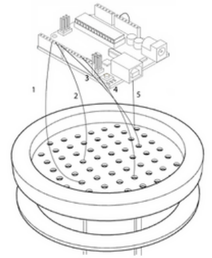
1: muscle wire 1
2: muscle wir...

Read more

ASSEMBLY

Step 1: Insert the wires from the microcontroller in the following fashion ...

Read more



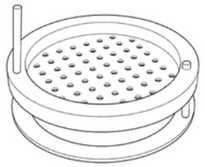
1: muscle wire 1
2: muscle wir...

Read more

ASSEMBLY

Step 1: Put the wood parts on top of the lamp shade in the illustrated order....

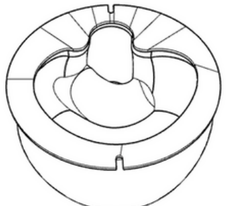
Read more



ASSEMBLY

Step 1: Place the lid on the lampshade so that the dowels fall into the "U" shaped...

Read more



PRODUCT WEBSITE

YouLing

The light that keeps you company

HOME SHOP ASSEMBLY REPAIR DISPOSAL Log In

FAQ

How Do I change the LEDs?

Order new LED sets from the website, takeout off the old LEDs from Arduino and put the new ones on pin 10.

My circuit does not light up?

Verify if the LEDs are the source of problems by observing the behaviour of the muscle wires. If the muscle wires still respond to sound, replace the LEDs. If not, get a new micro-controller from the website and test with the current circuit. If the problem persists, get a new set of circuits from the website.

My wooden part broke?

Get a new part from the website if not only the joint are broken. If the joints are broken, replace them with the extra ones provided with the package.

My shade broke?

Consider getting a new one from the website.

Repair and Refund

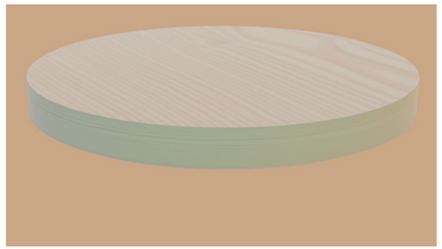
Contact the designer to inquire about special repairs and refund.

YouLing

The light that keeps you company

HOME SHOP ASSEMBLY REPAIR DISPOSAL Log In

Lid



The lid is 100% made of plywood, it can be reassembled into a cylindric container and re-used.
To dispose of it you can bring it to a local wood recycling center.

DISPOSAL DIY

Plywood is recyclable, even if it is oriented strand board. In contrast, particle board must be disposed of.

If not, plywood can also be disposed in compost bin.

Shade

The lid is 100% made of plywood, it can be reassembled into a cylindric container and re-used.
To dispose of it you can bring it to a local wood recycling center.

CIRCULAR ECONOMY STRATEGIES

Modularity

The product's website offers the possibility to purchase different parts of the lamp separately. This facilitates repairability, as customers would not need to get a whole new lamp, instead, they can change the obsolete parts only.

On a larger scope, when multiple other versions of the lamp will be made, customers can choose to replace their old parts with new shapes, thus increasing the psychological life span of the product. As the lamp is made for disassembly and constitutes only 2 parts in terms of structure, it would be rather simple to do any replacement.

Product's After Life

The lamp's different parts are designed so that they can have versatile uses. For example, both the wooden box and the 3D-printed shade can serve as containers. The wooden box can also act as mirror frames, circular pegboard, decorative item for walls, etc.

The 3D-printed part can contain larger items, for example, can be transformed into a flower vase, Halloween candy bowl, etc.

Disposal

For end-of-life disposal, the PLA can be recycled in many places at Concordia (and even more in Montreal), for example, there is the Digifab and CP3 facilities. The wood can be disposed at a wood treatment/recycling center, or it can be brought to reuse centers such as Cuccur.

SUSTAINABILITY ANALYSIS

Recyclability

- The structure is designed for disassembly
- Electronics are designed for disassembly
- Recyclable materials used for lamp's structure

Sourcing

- All electronics used except the LEDs are recycled from diverse places (home storage and past projects).
- The wood is sourced from the scrap bin at the wood shop.
- The fabrics and thread used are recycled from past projects.

Reusability

- The top part can be disassembled and re-assembled in other forms.
- Internal circuitry can be reused for other purposes.
- The bottom part (lamp shade) can be shredded and filed as 3D printing filaments.

Life Span

- Plywood: 30-40 years
- PLA: 12-18 years
- Micro-controller: 2-3 years (hot environment); 10-15 years (cool environment)
- LEDs: 10h/day: 14 years

- Anticipated life span without repairment: 10 years
- Anticipated life span with repairment: >40 years

REFLECTION

Concept Execution

I was able to execute the initial concept, which is about the aging process of a commodity (in this case, a lamp), to see how this evolution process reflects its past and projects the future.

To do this, I programmed the muscle wires to read from the microphone and to generate certain behaviours as the sounds get recorded. The more sounds it can remember, the more stable and less random the behaviour will be.

As the lamp gets shaped by its environment and settles down on its personality trait, its behaviour will let people understand its lived past, and thus, invite a reflection about the environment that they are creating for the lamp.

Areas to Improve

I would like to experiment with more lighting devices. I tried a few types of LEDs and a few colour, and realized that any pirahna LED in the warmer tone (<5000k) will cast a yellowish light to my shade, which looked like a dirty tint. If it is possible, I would like to experiment with other warm colours from other LEDs, to see if there could be a change.

On the same note, I would also like to experiment with a clearer material than the clear 3D printing filaments, so that the interior can be better seen.

Speaking of the internal structure, another version of the lamp that I would like to try is one where the muscle wires are directly exposed and that can be touched, so that this liveliness can be better felt. I would also consider changing the plywood to another wood material that can be biodegradable.

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