Idea 1

Petals are of same shape, reducing costs and saving materials (Spec 4.3)

Orange acrylic petals give an appealing ambient light (Spec 7.1, 9.3) to surrounding

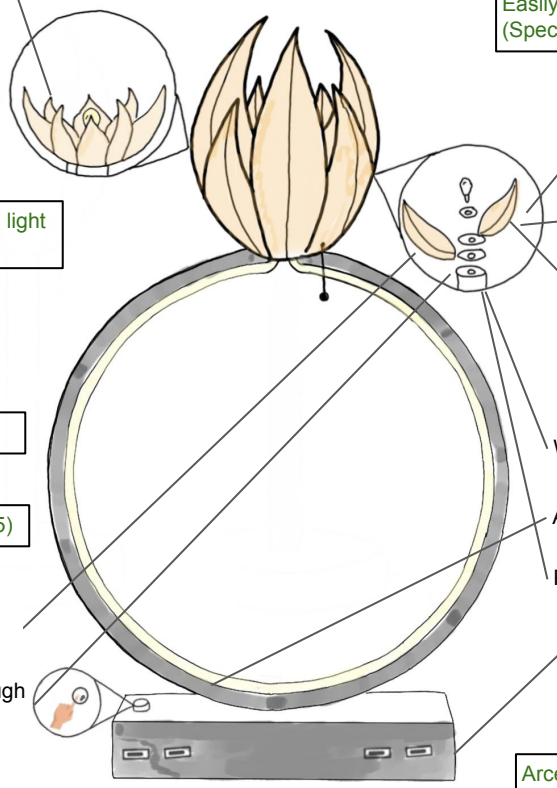
Bulb lacks protection, making it dangerous when petals are opened (Spec 6.1)

Orange acrylic petals are easy to shape (Spec 9.5)

Orange acrylic petals

Petals made with vacuum forming machine by: heating, forming, cooling (Spec 8.1)

Easily manufacturable using a bandsaw/disc sander (Spec 8.1)



Wooden base is made of softwood to match light tones of orange acrylic (Spec 9.3)

Unlikely to provide enough task specific light exposure (Spec 7.1)

Light direction is not adjustable (Spec 7.4)

Pull switch is easy and safe to use (Spec 7.5)

The pull switch is attached by screwing through one of the inner petals.

Arced shape provide wide lighting exposure and ambient lighting (Spec 7.1)

Light color isn't adjustable (Spec 7.4, 7.3)

Acrylic used for petals is easily reusable (Spec 4.1)

Finishing aluminum poles is quick and easy (Spec 8.1, 9.1)

Aluminium circular pole is lightweight - aiding portability (Spec 5.3)

Finishing softwood is quick and easy (Spec 8.1, 9.1)

Aluminium pole is difficult to manufacture (Spec 8.1)

Finishing aluminium pole makes it look appealing (Spec 1.1)

Easy electronic integration by pre-designing holes in CAD for USB ports (Spec 9.4)

Dimming system allows user to adjust light intensity (Spec 7.3)

Both the base and the pole are made of sustainable material - softwood (Spec 4.1)

Idea 2

Moderate light exposure of both task specific and ambient lighting (Spec 7.1)

Soft wood for base is a sustainable material (Spec 4.1)

Light bulb is exposed to user, making prone to breakage (Spec 6.1)

Aluminium can easily be shaped by pressing it on a wooden mould (Spec 8.1)

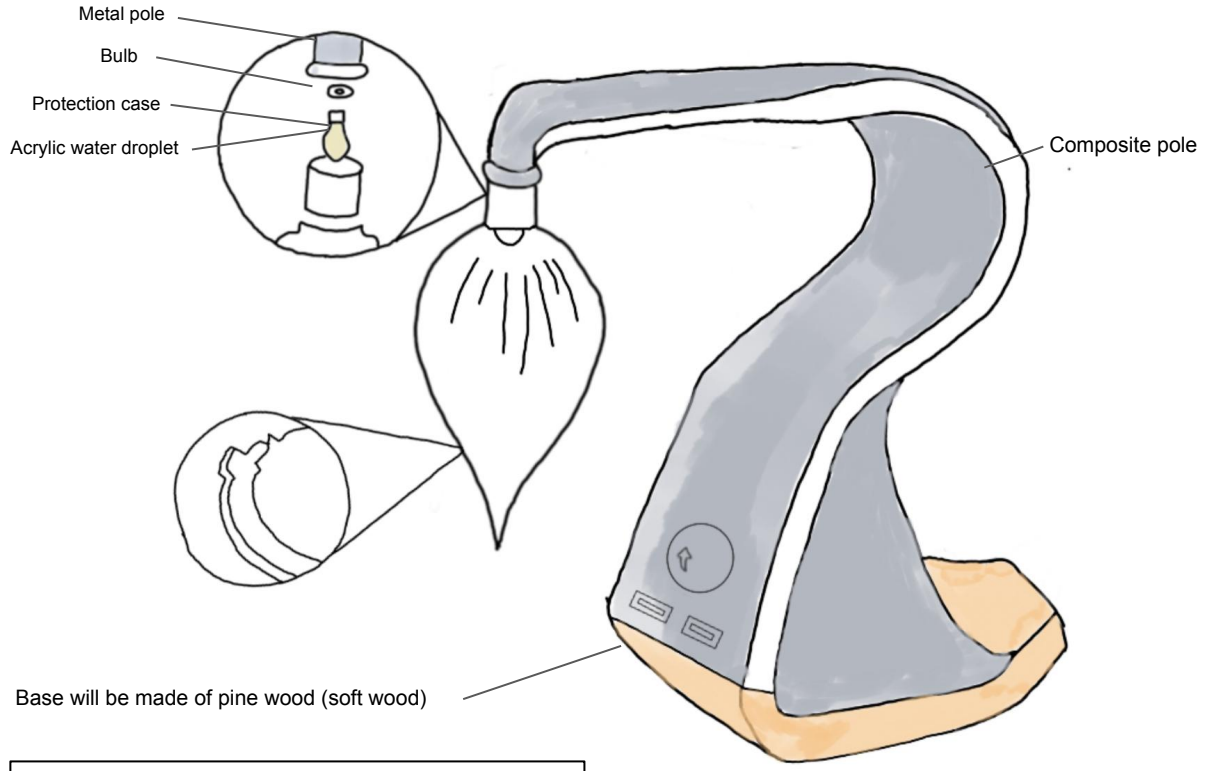
Using hacksaw & pillar drill, aluminium pole can be shaped & built into base (Spec 8.1)

Time consuming to process of components with epoxy resin (Spec 9.4)

Neither light direction nor light color can be adjusted which reduces (Spec 7.3, 7.4)

Hard to integrate electronics as it requires sawing holes in softwood base (Spec 9.4)

USB charging integration reduces clutter of user's workspace (Spac 7.2)



Pole is a composite, with layers: Aluminium, Foam and Aluminium (Spec 9)

Silent touch light regulation to adjust the light intensity (Spec 7.3)

Aluminium can easily be shaped by pressing it on a mould (Spec 8)

Pine wood base is lightweight aiding ease of transportation (Spec 5.3)

Aluminium for the pole is a sustainable material (Spec 4.1)

Aluminium layers will provide a finish making it more pleasing (Spec 9.3)

Materials are easily manipulative and aesthetically pleasing (Spec 9)

Pine wood base has aesthetically pleasing grains (Spec 9.3)

Acrylic used for droplet is easily reusable (Spec 4.1)

Composite material will make product more pleasing (Spec 9.3), durable (Spec 2.3), easily manufacturable (Spec 8.1)

Time consuming to hide imperfections of epoxy resin (Spec 9.4)

Hard electronics integration as it requires sawing aluminium pole holes (Spec 9.4)

Idea 3

Light color/temperature isn't adjustable (Spec 7.3)

Lamp is not adjustable and the direction of the light cannot be altered (7.4)

Limited provision of task specific light exposure (Spec 7.1)

Hardwood pole to hold the shade - increases stability (Spec 6.4)

Hardwood pole protects from accessing wires that run through it (Spec 6.1)

Marine colors positively contribute towards increased productivity of user (Spec 2.1)

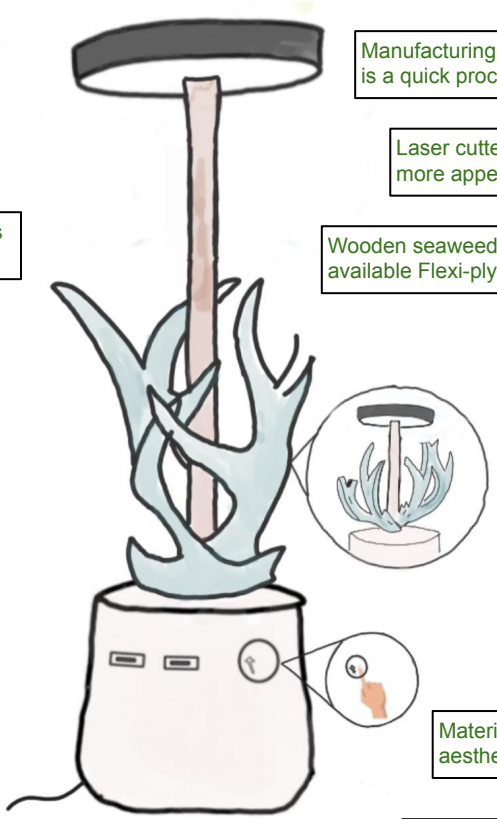
Patterns to seawood can be added with laser cutter (Spec 1, 8.1)

Manufacturing seaweed with flexiply using laser cutter is a quick process (Spec 8.1)

Laser cutter allows adding patterns to make design more appealing (Spec 2.1)

Frosted polypropylene has a light carbon footprint and is biodegradable (Spec 4.1)

Wooden seaweed is manufactured using cheap and readily available Flexi-ply (Spec 3.2)



Wooden seaweed can be sanded to smoothen and ensure safety (Spec 6.2, 8.1)

USB charging integration reduces clutter of user's workspace (Spac 7.2)

Materials are easily manipulative and aesthetically pleasing (Spec 9)

Hidden wires effectively avoids electrical accidents (Spec 6.1)

Silent touch light regulation to adjust the light intensity (Spec 7.3)

Soft wood used for base and pole, is a sustainable material (Spec 4.1)

Hard to integrate the cable as it will run through wooden base to USBs and the bulb (Spec 8.1)

Assembling with epoxy resin is time consuming and error prone (Spec 9.4)

Seawood is made by cutting and gluing layers of flexiply (Spec 8)

Time consuming electronics integration due to need of resawing base (Spec 9.4)

Hiding imperfections by finishing is time consuming and error prone (Spec 9.4)

Idea 4

Hard to manufacture in school due to complex components' combination (Spec 8)

Only smooth rounded edges make it very safe (Spec 6.2)

Moderate light exposure of task specific lighting (Spec 7.1)

Efficient LEDs as the light source (Spec 4.4)

Not enough ambient lighting exposure (Spec 7.1)

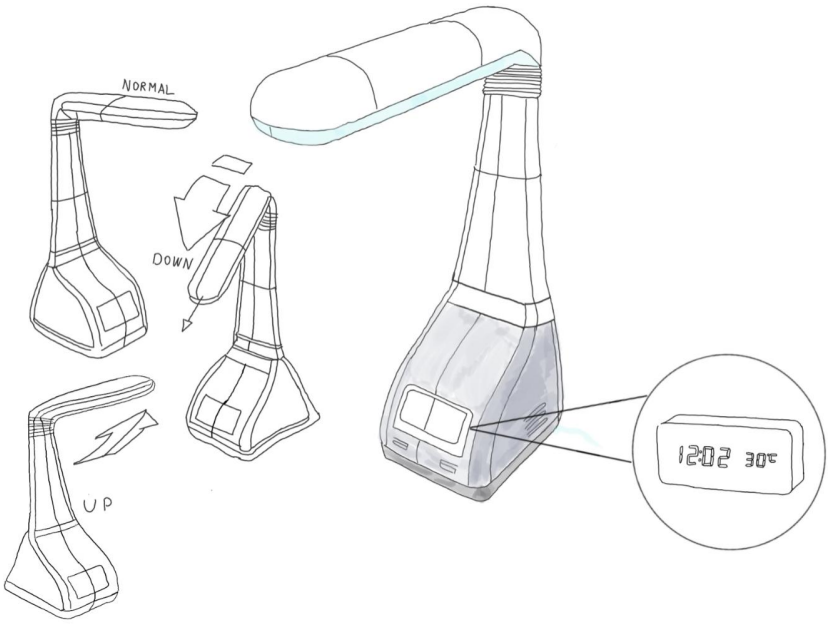
LED strips are hidden from users preventing electrical injuries (Spec 6.1)

Integration of clock aids reduces clutter of user's workspace (Spec 7.2)

Integration of two USB ports reduces clutter of user's workspace (Spac 7.2)

Easily adjustable light direction by turning the lamp head (Spec 7.4)

A lot of material is required for manufacturing, space isn't being used efficiently (Spec 5.1)



Electronics integration by pre-designing holes in CAD to clock size (Spec 9.4)

Attaching electronics with epoxy resin is easy and fast (Spec 9.4)

Electronics integration by pre-designing holes in CAD to USB-ports' size (Spec 9.4)

Idea 5

Materials are easily manipulative and aesthetically pleasing (Spec 9)

Plywood composite is cheap (Spec 3.1), lightweight (Spec 5.3), has pleasing wood/glue layers (Spec 1.1)

It is designed for disassembly and hence can be easily disassembled (Spec 4.2)

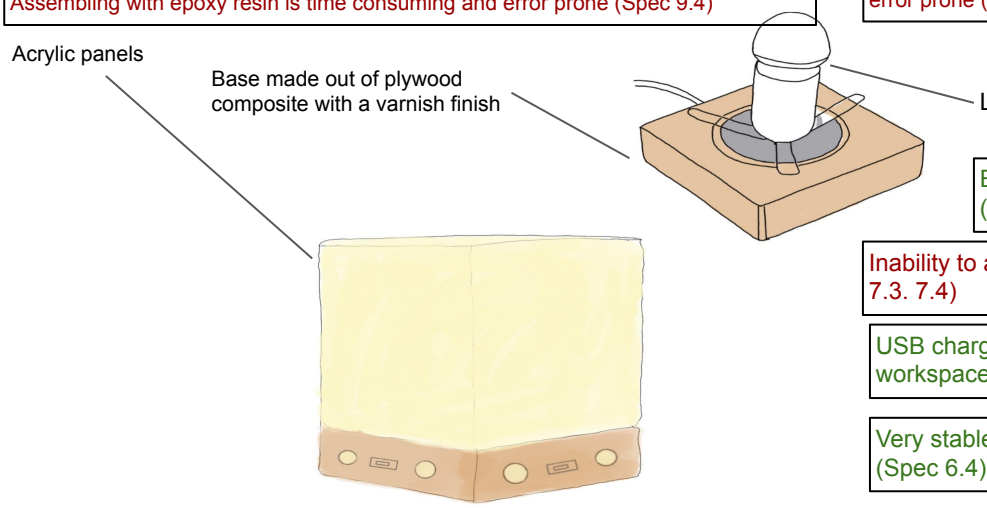
Protective case and no exposed electronics increases user safety (Spec 6.1)

It has abundant sharp edges may pose risk of injuries for user (Spec 6.2)

Hiding imperfections by finishing is time consuming and error prone (Spec 9.4)

Sawing holes in softwood for electronics integration is error prone (Spec 9.4)

Assembling with epoxy resin is time consuming and error prone (Spec 9.4)



Efficient LED bulb as the light source (Spec 4.4)

Inability to adjust light intensity/direction/color (Spec 7.3. 7.4)

USB charging integration reduces clutter of user's workspace (Spac 7.2)

Very stable construction due to its cubic shape (Spec 6.4)

Lamp's flat surface allows adding vinyl stickers for greater customization (Spec 7.4)

Multi-directional light emission ensures all workspace areas are illuminated (Spec 7.4)

Minimalistic design make it suitable for wide range of workspaces (Spec 1)

Idea 6

Exposed electronics pose risk of injuries for user (Spec 6.1)

Light color is adjustable, so greater customisation allowed to user (Spec 7.3)

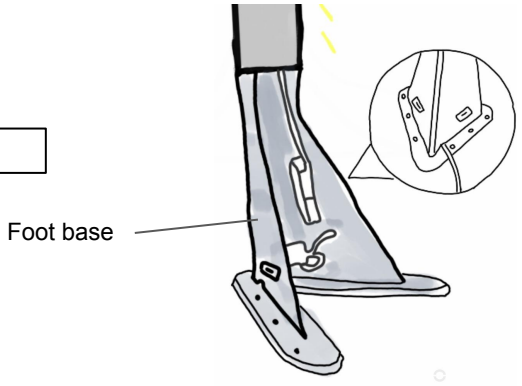
Remote-control allows users to change light color from long distance (Spec 7.5)

Provide wide lighting exposure of both ambient and task lighting (Spec 7.1)

Foot bases supporting the lamp increases its stability and safety (Spec 6.4)

Suitable for wide range of environments due to minimalistic design (Spec 1.1)

Multi-directional output ensures wide illumination covering all workspace areas (Spec 7.4)

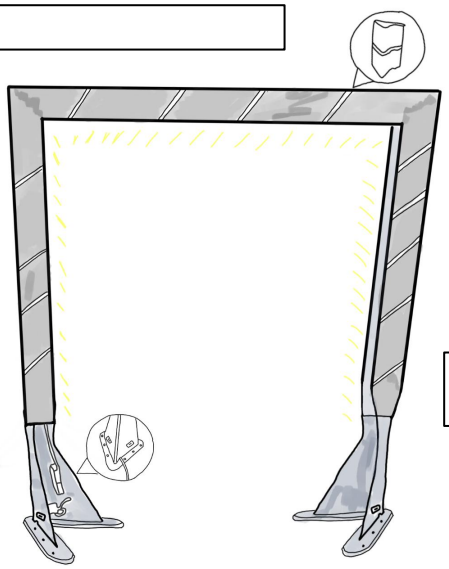


Abundant amount of sharp edges pose risk of injuries for user (Spec 6.2)

Light direction is not adjustable (Spec 7.4)

Hidden wires and circuits (Spec 6.1) makes the lamp safe to use

Each foot base is the same shape, reducing manufacturing costs (Spec 4.3)



Exposed electronics reduce product lifetime (Spec 2.3)

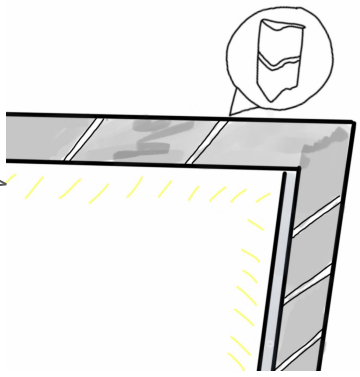
Efficient LEDs as the light source (Spec 4.4)

Assembling plastic components & electronics is easy/fast (Spec 9.4)

Integration of four USB ports reduces clutter of user's workspace (Spac 7.2)

Electronics integration by pre-designing holes in CAD to USB-ports' size (Spec 9.4)

Easily adjustable to any desk size by printing additional arc segments and joining them using the joints (Spec 5.2)



Arc-segment relies on adhesives making it hard to disassemble components (Spec 4.2)

(Spec 7.3) Light intensity is not adjustable

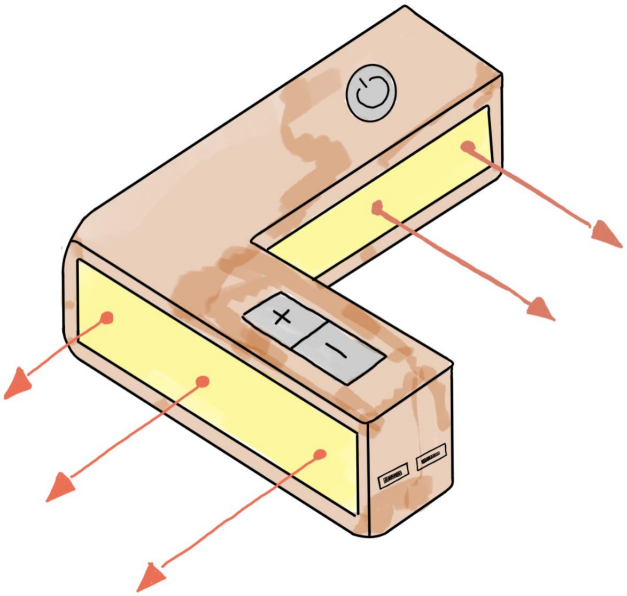
(Spec 5.2) Adjustable shape by customizing numbers and direction of arc segments

Components manufactured with 3D printing ensure little waste and accuracy (Spec 8)

Major components can be manufactured using sustainable 3D printing materials (Spec 9)

Innovative construction minimizes space consumption, aiding workspace clutter reduction (Spec 2.2, 5.1)

Concept 1 (from Idea 5)



Multi-directional light emission allows for wide range of lighting exposure (Spec 7.4)

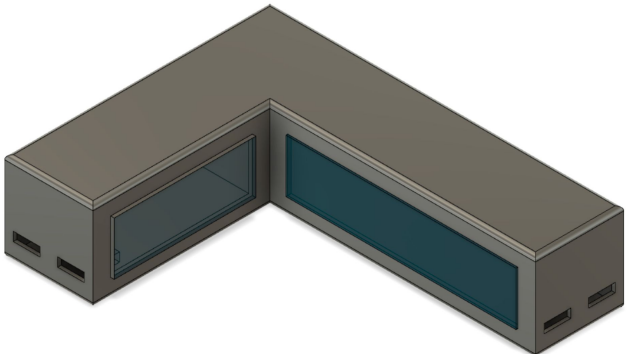
Minimalistic design might appeal to wider range of market segments (Spec 1.1, 1.2)

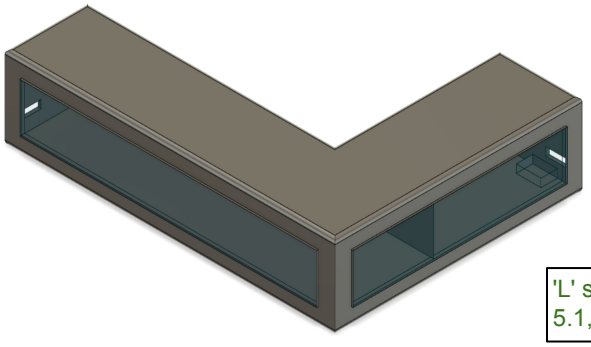
Pleasing aesthetics will contribute towards its widespread adoption & omnipresence (Spec 1.1, 1.2)

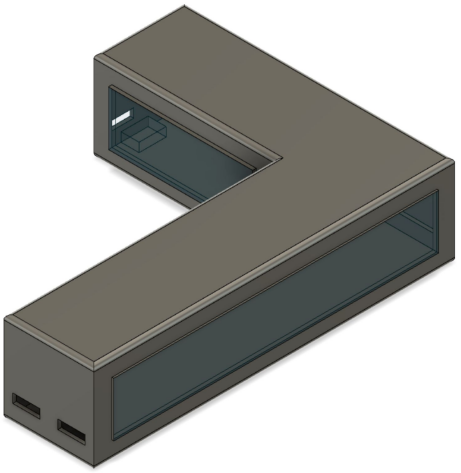
Gluing acrylic panels onto wood is complex and time consuming (Spec 8)

Attaching PCB to the base is complex and time consuming (Spec 8)

3D Graphical Modelling (digital drawings)







Four USB-ports from different sides contribute to reducing workspace clutter (Spec 8.1, 8.3)

Efficient positioning of USB-ports make them more intuitive to utilise (Spec 8.1, 8.3)

'L' shape offers wide variety of positioning options in user's workplace (Spec 5.1, 5.2)

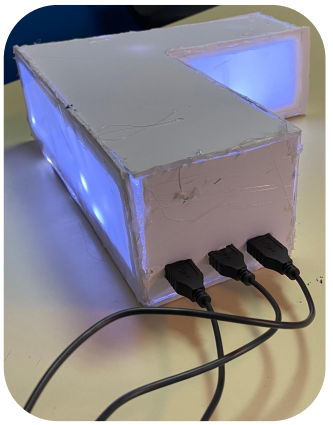
Rounded corners reduce risk of accidental injuries (cuts) (Spec 5.1, 5.2)

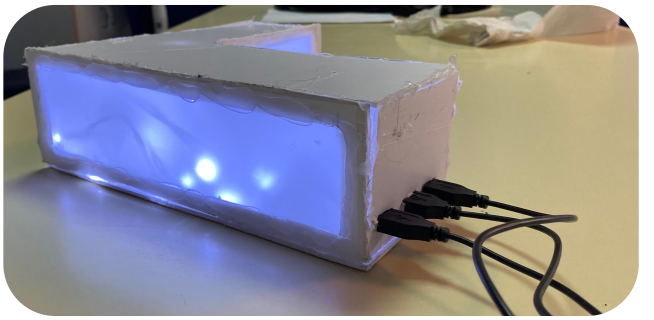
Reduced manufacturing costs will increase affordability and adoption of innovation (Spec 8.1, 8.3)

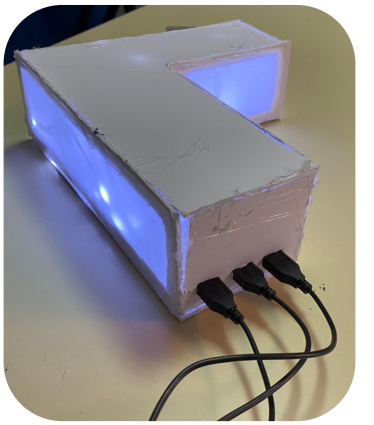
It's manufacturable with only 8 parts, hence reducing manufacturing speed/waste (Spec 8.1, 8.3)

Concept 1 (from Idea 5)

Physical Modelling & Evaluation based on observation of users using the concept (in scale of 1:1)







User feedback in terms of Design Specifications

Strengths:

(Spec 5.1) Maximises space usage by covering most area with light-emitting windows

(Spec 6.1) Internal bulbs are hidden behind walls reducing risk of injury

(Spec 5.3) Efficient use of materials make it lightweight, aiding transportation ease

(Spec 6.4) Large flat surface area ensures stability on desk

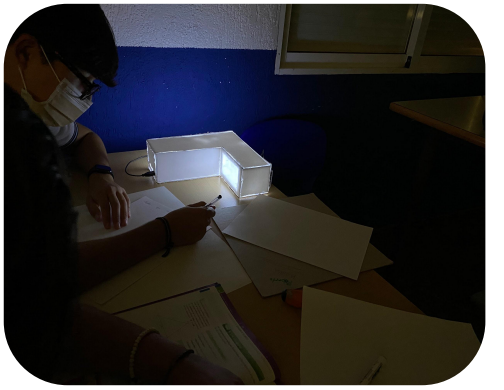
(Spec 2.2) Advantages of innovation are immediately observed over existing lamps

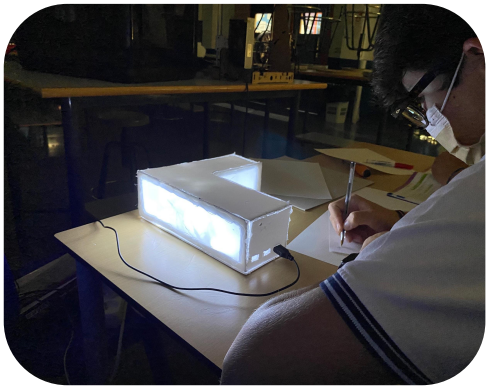
(Spec 7.2) USB-ports integration optimizes use of space and reduce workspace clutter

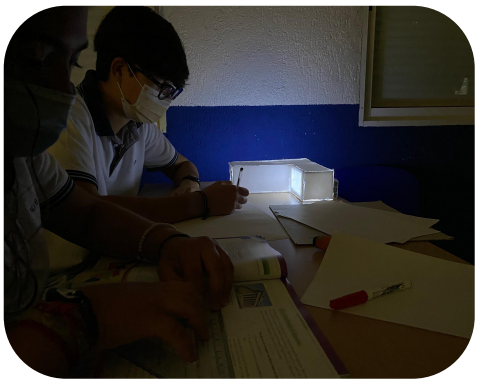
Weaknesses:

(Spec 7.1) Insufficient light output to cover entire workspace, reducing user's productivity

(Spec 5.2 & 7.4) Inability to adjust shape and light direction

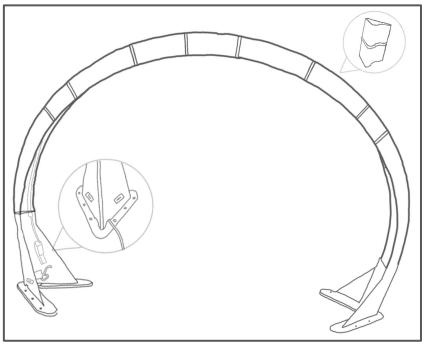






Concept 2 (from Idea 6)

Changing the form of the structure by bending the arc-segment



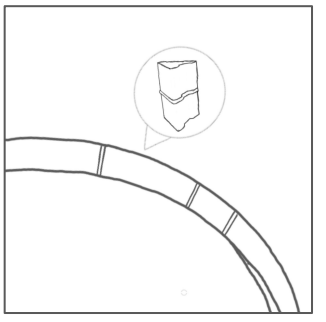
Integration of LED controller to adjust light color/intensity

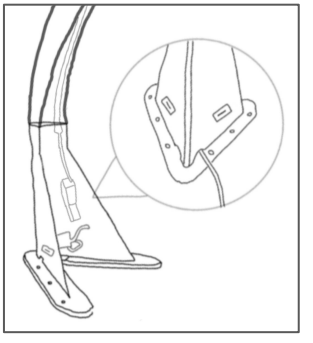
LEDs will be purchased with ability of controlling light intensity and color via a remote control

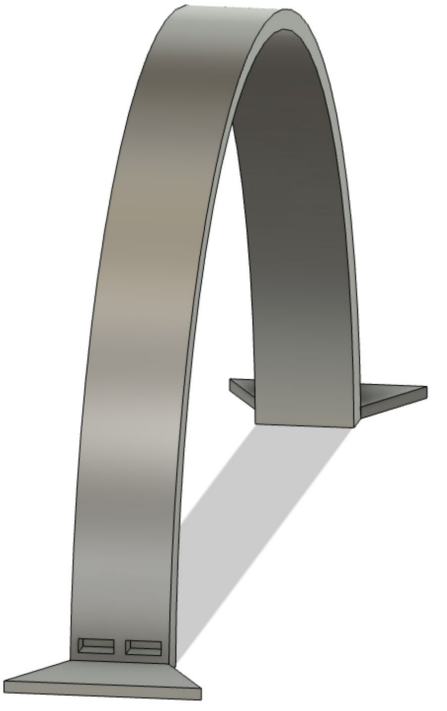
(Spec 5.2) Bent shape of arc-segments allows for construction of arc-like construction

(Spec 5.2) Shape and size is adjustable, allowing it to fit a wide range of workspaces

(Spec 4.2) Heavily relies on adhesives making it hard to disassemble and not adjustable at all







Concept 2 (from Idea 6)

Physical Modelling & Evaluation based on observation of users using the concept (in small scale 2:1)

User feedback in terms of Design Specifications

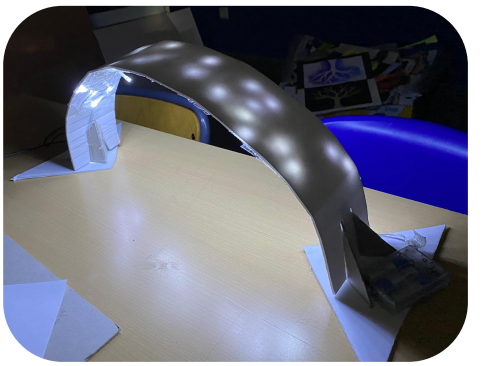
Strengths:

(Spec 7.1) Light exposure is wide and bright covering entire user's workspace

(Spec 1.2) Minimalistic design will suit a wide range of workspaces

(Spec 7.5) USB ports are easily identifiable, accessible and safe

(Spec 7.2) Four USB-ports are provided greatly contributing to reducing workspace clutter



Weaknesses:

(Spec 6.1) - Cables are exposed to user, increasing risk of injuries

(Spec 1.1) - Cables are exposed to user, making it less aesthetically pleasing

(Spec 6.4) - Exposed cables reduce durability and potentially product's retail value

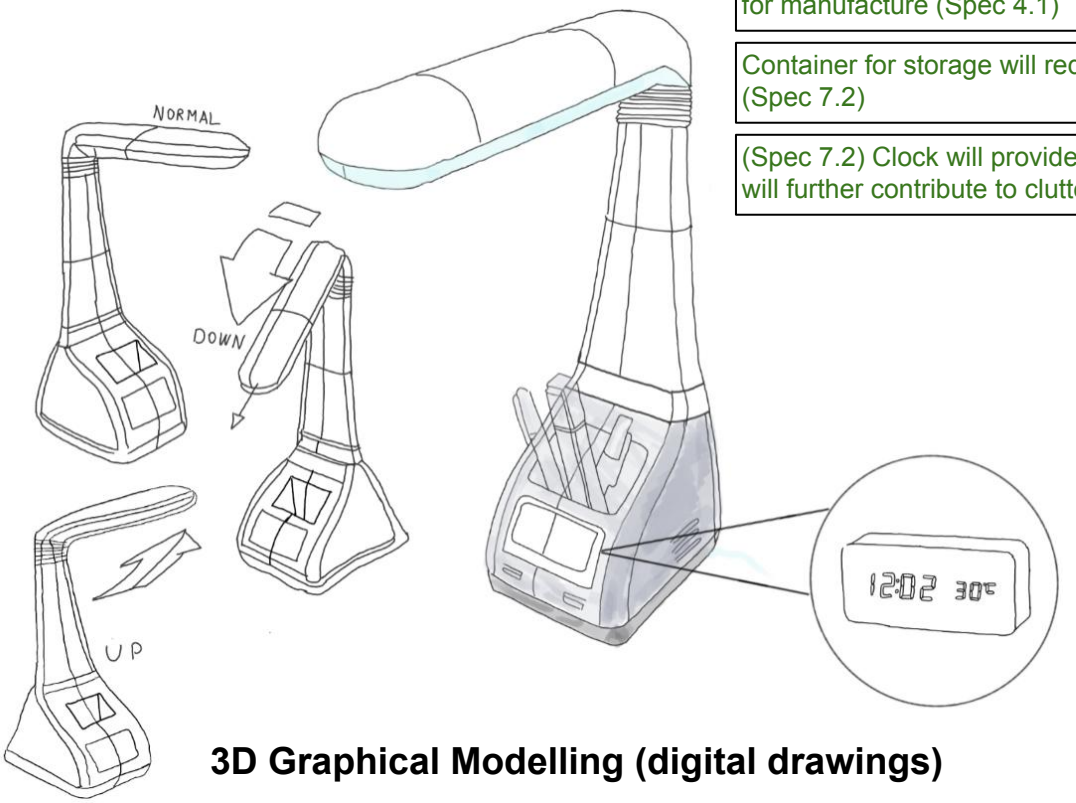
Concept 3 (from Idea 4)

3D Graphical Modelling (drawings)

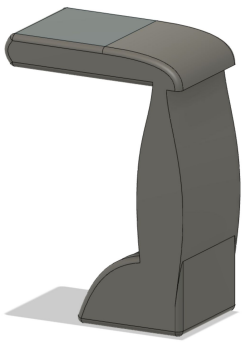
Container for storage will reduce materials quantity used for manufacture (Spec 4.1)

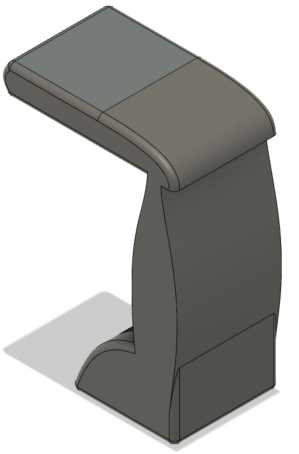
Container for storage will reduce workspace clutter (Spec 7.2)

(Spec 7.2) Clock will provide an additional utility which will further contribute to clutter reduction



3D Graphical Modelling (digital drawings)



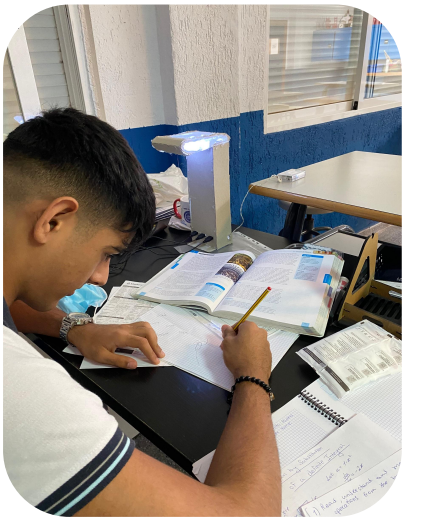


(Spec 5.1, 5.4) Has small surface area, so occupies little desk space - making it suitable for constrained workspaces

(Spec 7.2) Only integrates two USB ports which might be insufficient for all users

Concept 3 (from Idea 4)

Physical Modelling & Evaluation based on observation of users using the concept (in scale of 1:1)



User feedback in terms of Design Specifications

Strengths:

(Spec 6.1) Pole safely hides internal bulbs/circuits - reducing risk of injury

(Spec 7.1) Provides sufficient light exposure covering full area of the workspace

(Spec 1.2) Minimalistic design will suit a wide range of users' workspaces

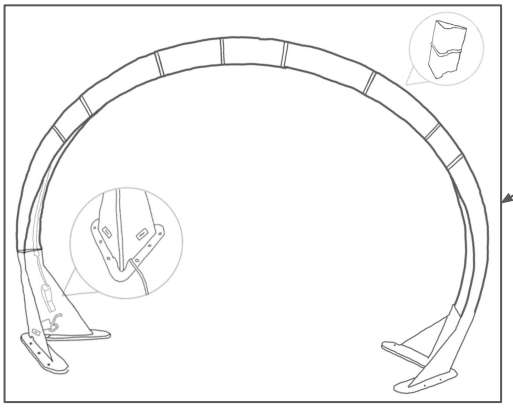
(Spec 1.1) Lamp is similar to regular lamps increasing product's compatibility

Weaknesses:

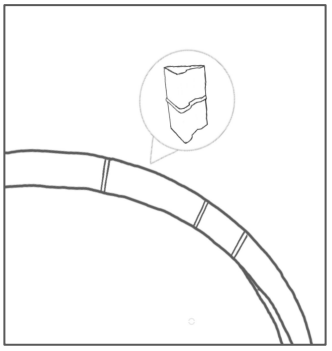
(Spec 6.4, 2.3) Small surface area & tall height make it unstable/unsafe.

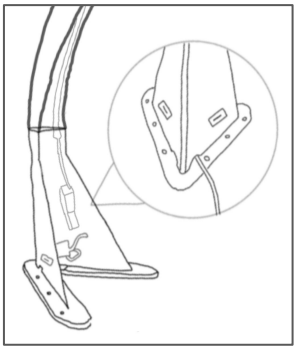
(Spec 7.4) Unadjustable light direction - unsuitable for wide range of users' workspaces

Justification of chosen design concept (2nd)



- Provides wide exposure of both task and ambient lighting (Spec 7.1)
- Incorporates numerous (4) USB charging sockets (Spec 7.2)
- Only uses efficient LED lighting (Spec 4.4)
- Construction is highly efficient in terms of space usage (Spec 5.1)





<u>USER FEEDBACK that contributed to choice of the design</u>

- (Spec 1) “I like futuristic aesthetics which make the lamp stand out”
- (Spec 5.1, 7.1) “I like efficiency of space usage and design’s bright illumination”
- (Spec 7.2) “I like integration of USB-ports, which will reduce my workspace clutter”

Arc Segment Modifications and Selection

Arc Segment 1

(Spec 4.2) Heavily relies on adhesives making it hard to disassemble and unadjustable

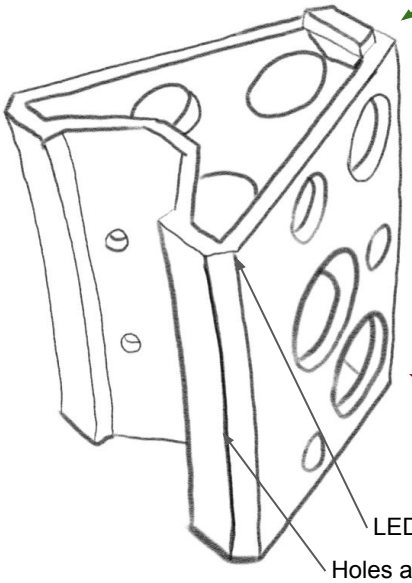
(Spec 4.1) Inefficient use of materials, without holes to reduce amount of materials used

USER FEEDBACK - Arc Segment

(Spec 5.2) “It seems to lack adjustability and hard to disassemble”

(Spec 2.3) Attaching LED strips inside makes it less prone to falling, increasing product lifetime

Arc Segment 2



USER FEEDBACK - Arc Segment

(Spec 2.1) “Adjustability of size and shape make it suitable for many workspaces”

(Spec 6.4) “Glue adhesives may be insufficient to safely hold arc segments“

(Spec 4.1) “I’d reduce amount of material used, making it more eco-friendly”

(Spec 2.1) “I’d make components more easily disassemblable to increase recyclability”

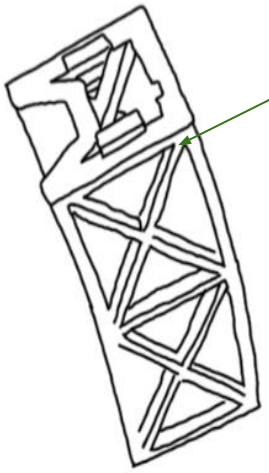
(Spec 4.1) Reduced amount of material making it a more eco-friendly product

(Spec 7.1) Holes may be insufficient to provide bright enough illumination

Arc Segment 3

(Spec 6.4, 7.4) Safety joints printed with each arc segment provide greater stability

(Spec 4.2) Made out of composable components making it easy to disassemble



USER FEEDBACK - Arc Segment

(Spec 6.1) “Maintains high safety standards due to cross linking poles”

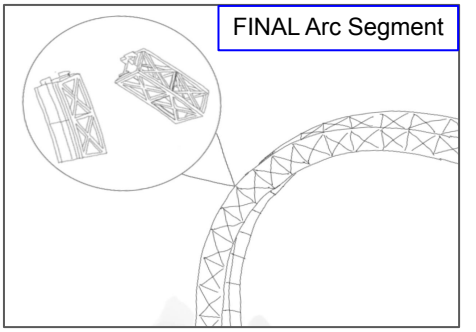
(Spec 4.2) “Use of joints increases stability and ease of disassembly”

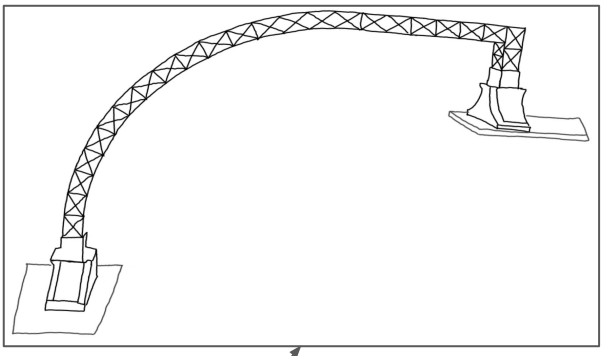
(Spec 9.1) “Has efficient use of material”

Arc Segment Modifications Selection (3rd) Overview

Inspiration was taken from New River Gorge Bridge in USA:

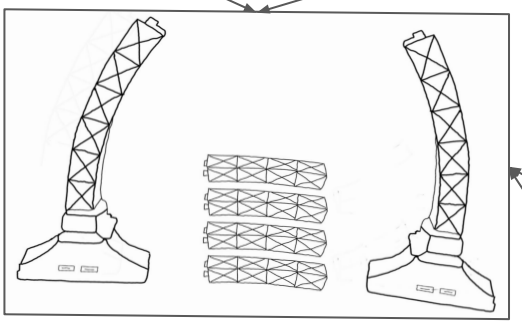
Bridge had a very similar arc-like structure





Cross shaped arc segments

Allows for minimization of materials used without sacrificing safety (User 3)



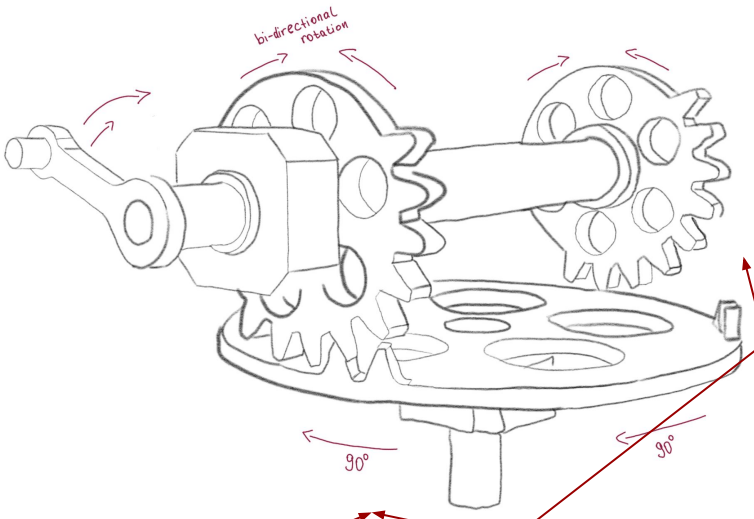
(Spec 5.2) Allows wide range of shapes by 3D printing more arc-segments

(Spec 5.2) Suitable for wide range of workspaces due to excellent adjustability

(Spec 5.2, 4.2) Disassemblable arc-segments increase product's suitability for wide range of workspaces

Rotating mechanism for light direction adjustability Modifications and Selections

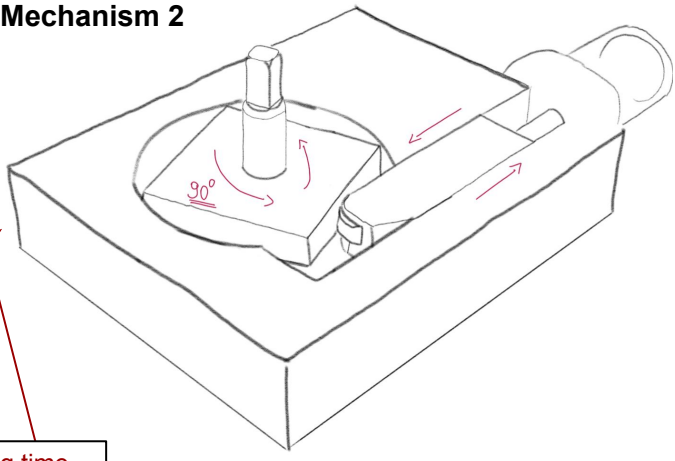
Mechanism 1



USER FEEDBACK

(Spec 7.4) “Unadjustable light direction limit task specific illumination to ensure productive work”

Mechanism 2



(Spec 8.1) Complex construction increasing manufacturing time

USER FEEDBACK

“Compact structure of 3rd mechanism fits well with product’s aesthetics”

“3rd mechanism has greater range of rotation (180°) than other mechanisms”

(Spec 5.1) “Large mechanisms are space consuming, so unsuitable for constrained workspaces”

(Spec 5.1) Compact size making it suitable for constrained workspaces

(Spec 7.4) Limited rotation. Only rotatable by 90°

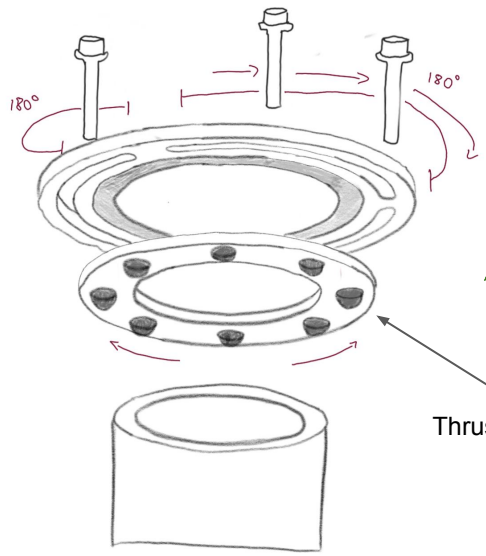
Easily manufacturable components with CAD/CAM increases speed (Spec 8.1) and minimises wastage (Spec 8.3)

Circular base shape may not fit well all workspaces (Spec 1.1)

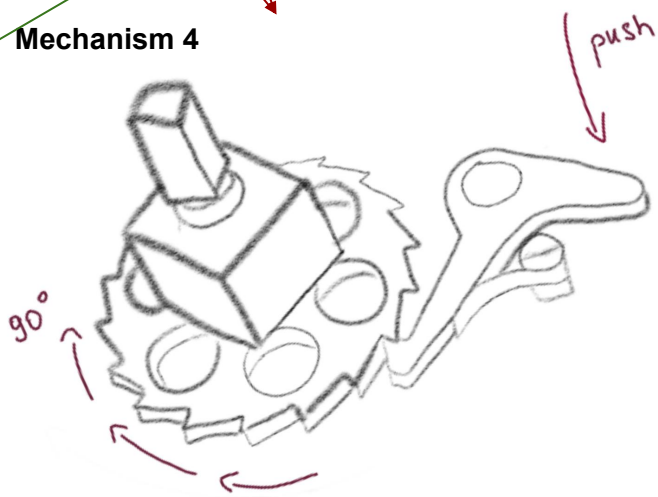
(Spec 4.2) Easily disassembled allows for simple repairment and replacement of components

(Spec 7.4) Rotation range of 180°

Mechanism 3 (selected based on user feedback)

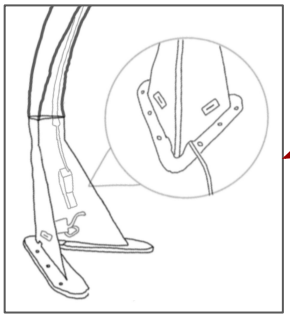


Mechanism 4



Foot Base Modifications and Selection

Base 1 - Original base

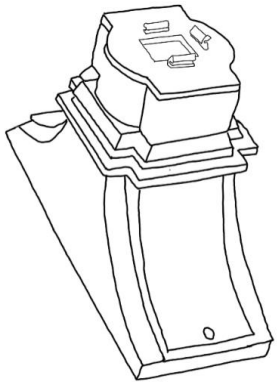


USER FEEDBACK - Foot Base

(Spec 6.1) “Cables of USB-ports and LEDs are exposed, increasing injury risks”

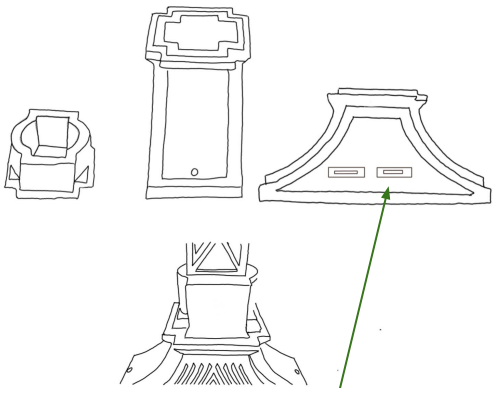
(Spec 6.4) “Bases seem unstable, making lamp unsafe and risky to use”

Base 2 - Base for mechanisms 1, 2 and 4



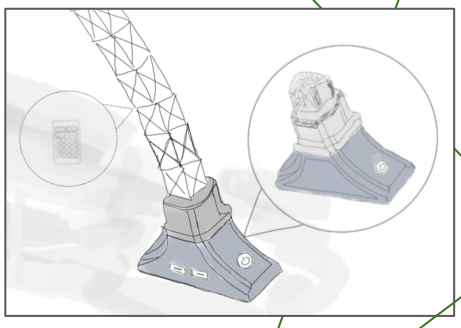
(Spec 6.4) Holes for screws to increase stability of the construction

(Spec 4.1) Ventilation design decreases the amount of material for manufacture

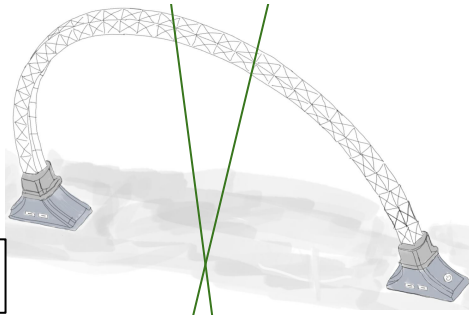


Possible construction of final product with this foot base

Easily disassembled components of increase recyclability (Spec 4.1) and increase production sustainability



(Spec 6.4) Increased bottom surface area makes lamp more stable increasing safety



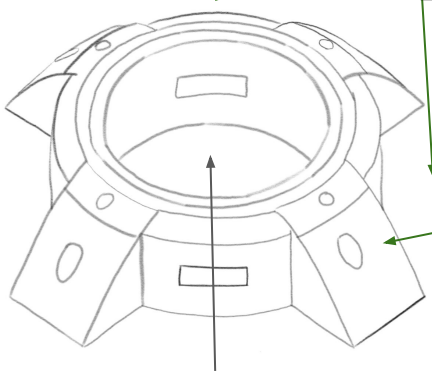
Greater volume allows more USB-ports integration and hide their electronics (User 4)

Ventilation to make lamp less prone to fire - increasing safety (Spec 6)

(Spec 6.1) Greater volume provide space to hide electronics to avoid injuries

Base 3 - Base for mechanism 3 (selected based on user feedback)

(Spec 8.1) Pre-designed holes allow easy screwing to the desk - increasing stability



(Spec 2) Four sub-feet allow for greater stability and safety

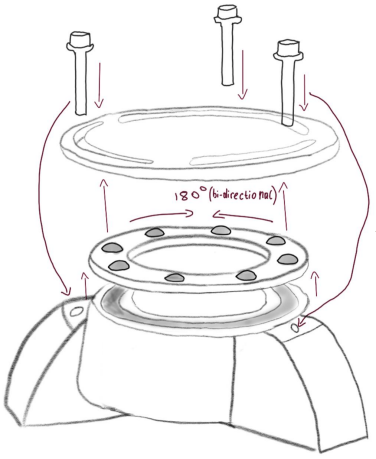
USER FEEDBACK - Foot Base

“2nd and 3rd bases seem suitable as they solve all limitations of 1st”

“However, since circular mechanism was chosen, 3rd base will be most suitable”

Wires will be stored inside and covered by rotational mechanisms

Foot base with Rotation Mechanism Selection Overview



(Spec 4.2) Easy to disassemble

No joints present to attach the arc-segment

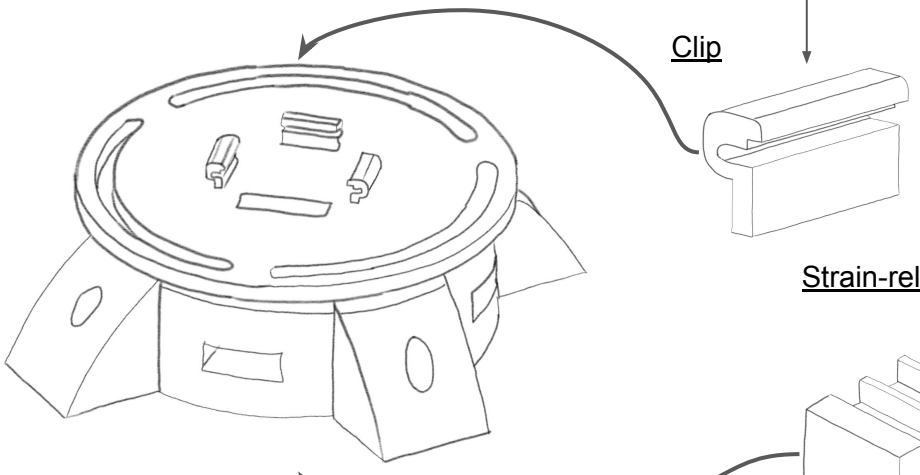
Opened bottom make cables stored inside prone to breaking during transportation

3D printed thrust bearing allows top platform to rotate by 100°

Foot base improvements

3 clips are inserted in top-plate's slots to align arc-segment

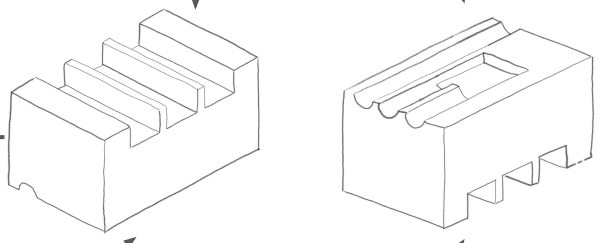
Clip



Strain-relief prevents strain on the solder joints of the LED-strip

Strain-relief's bottom has channels for leads of LED-strip

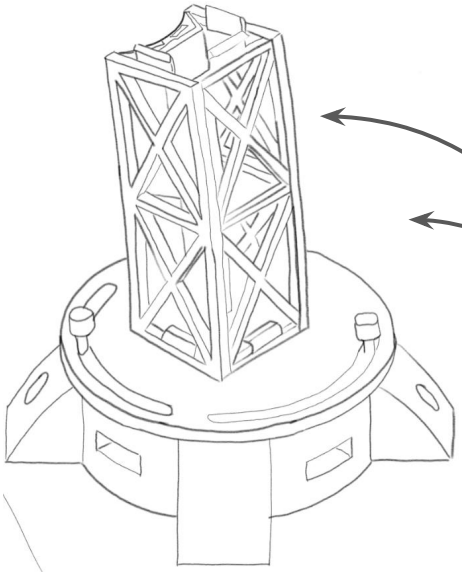
Strain-relief



Strain-relief contains resistor and capacitor to use it with LED-strips

Epoxy resin applied to strain-relief and placed over LED-strip's wires

Final Product (default shape)



Arc Segment

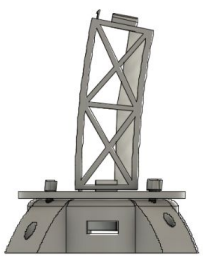
Foot base (with rotation mechanism)

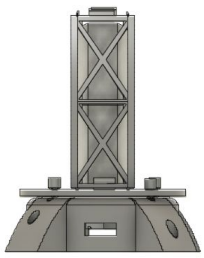
Isometric views

Isometric view of a possible shape construction

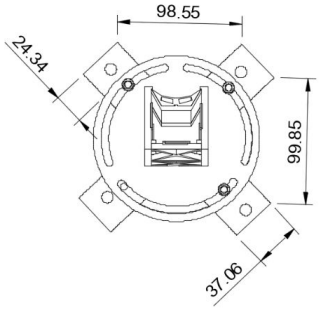
Isometric view of shape consutrction with minimum components

Item	Part name	Material	Manufacturing
1	Arc Segment	PLA Plastic	FDM 3D Printing
2	Foot base	PLA Plastic	FDM 3D Printing

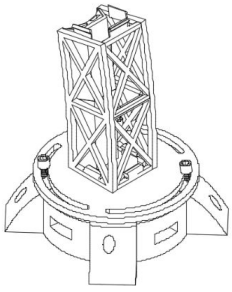




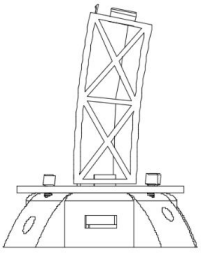
Top view



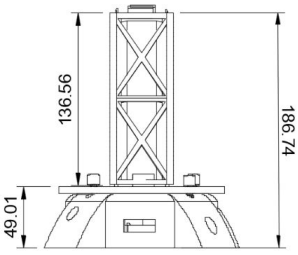
Isometric view



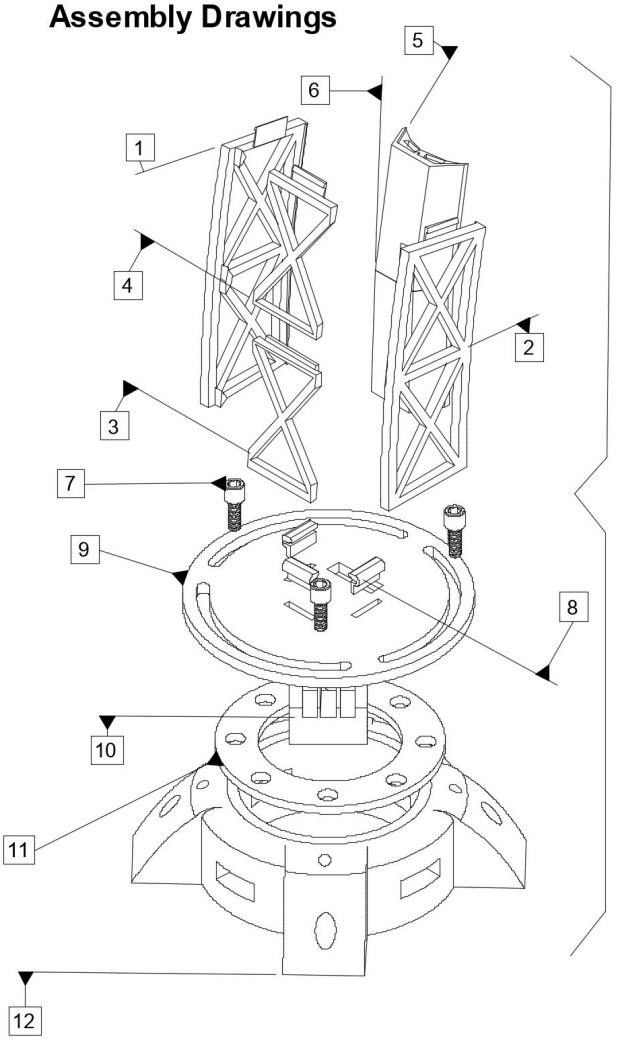
Side view



Front view



Assembly Drawings



Arc segment components

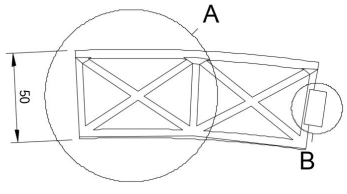
Item	Part name	Qty.
1	Side wall left	1
2	Side wall right	1
3	Top wall A	1
4	Top wall B	1
5	Bottom LED holder A	1
6	Bottom LED holder B	1
7	M5x30 Bolt (purchased)	3

Foot base components

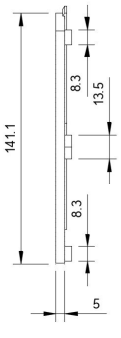
Item	Part name	Qty.
8	Clip	3
9	Top plate	1
10	Strain relief	1
11	Bearing cage	1
12	Base	1

1. Side wall

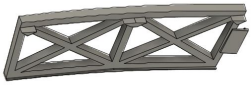
Side view



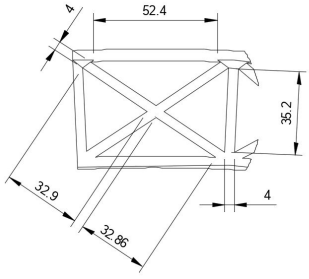
Top view



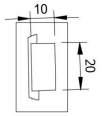
Isometric view



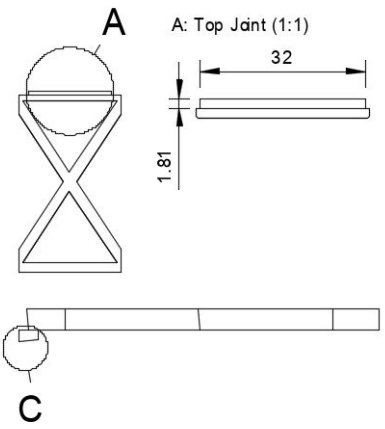
A: Crossed section (1:1.5)



B: Side joint (1:1.5)

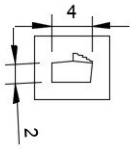


2. Top wall A

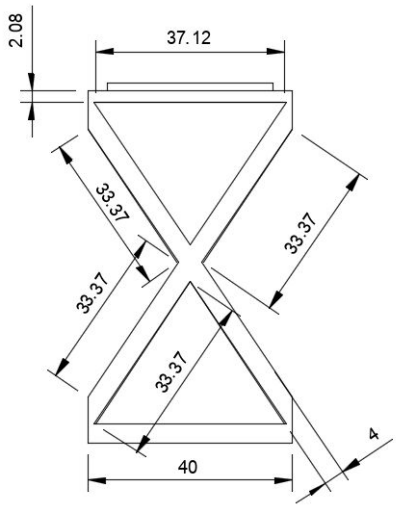


Isometric view (SW)

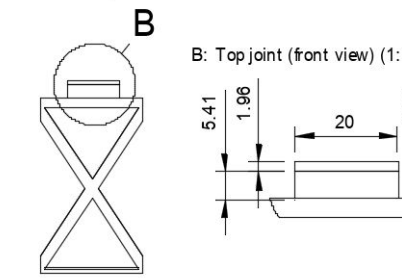
C: Top joint (side view) (2:1)



Both 2nd and 3rd part (2nd part is illstrated)



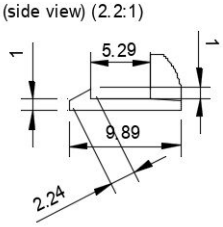
3. Top wall B

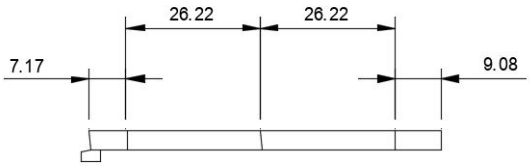


B: Top joint (front view) (1:1)

Isometric view (SW)

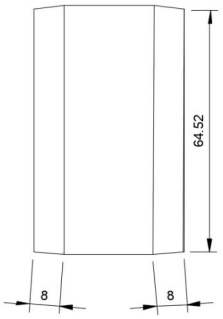
D: Top joint (side view) (2.2:1)



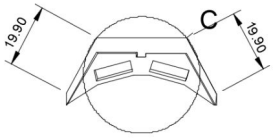


4. Bottom LED holder A

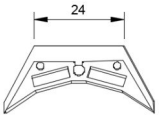
Top view



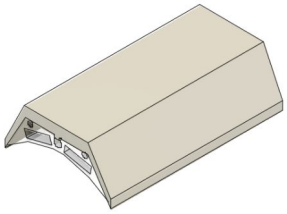
Back view



Front view

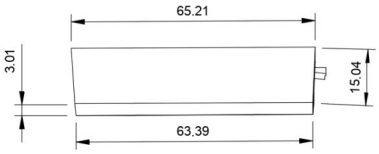


Isometric view (NE)

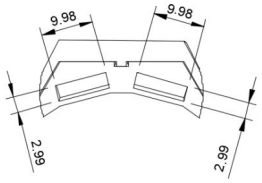


Both 4th and 5th part

Side view

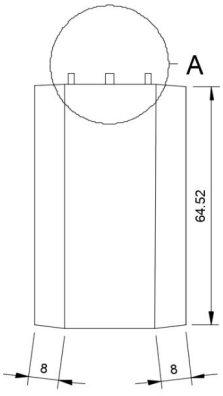


C: Tubes for cabels (1.4:1)

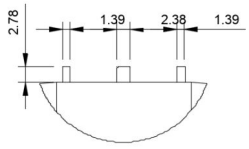


5. Bottom LED holder B

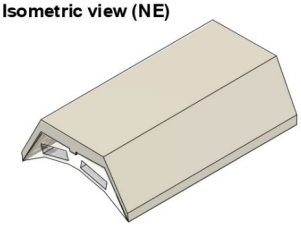
Top view



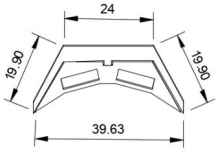
A: Front joints (1.5:1)



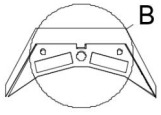
Isometric view (NE)



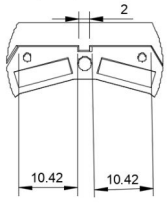
Front view



Back view



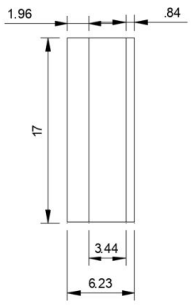
B: Front joints (1.5:1)



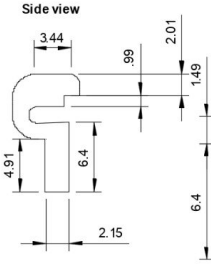
Component 2: Foot base

7. Clip

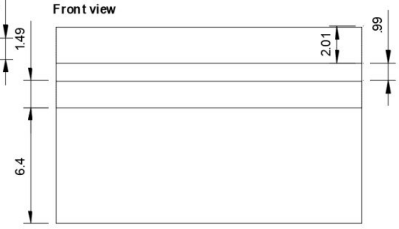
Top view



Side view

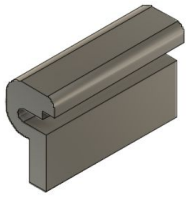


Front view



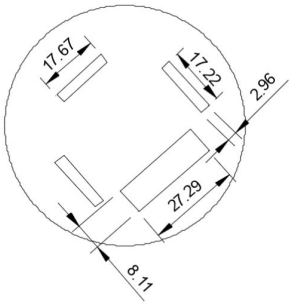
Back view

Isometric view

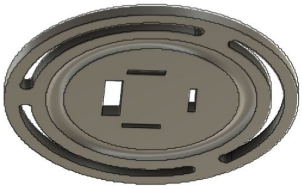


8. Top plate

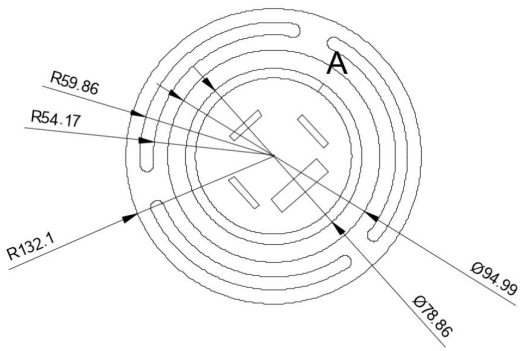
A: Holes for cables & joints (1:1.3)



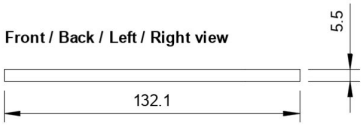
Isometric view



Top view

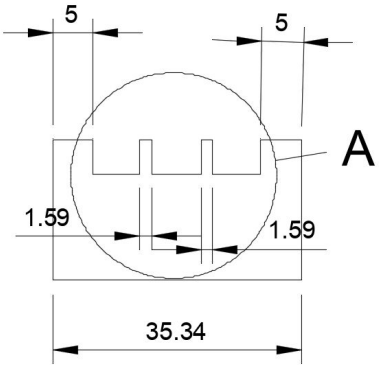


Front / Back / Left / Right view

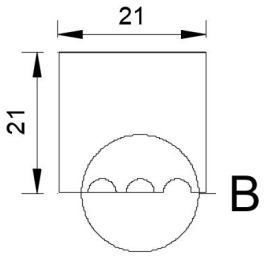


9. Strain relief

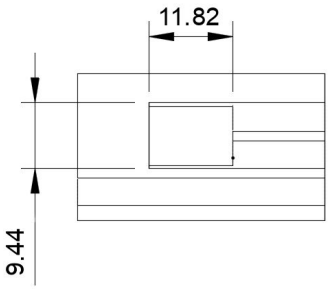
Side view



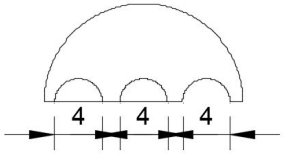
Left view



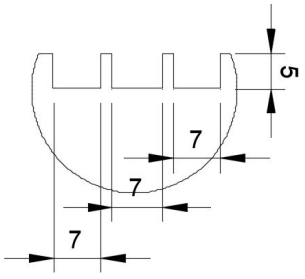
Bottom view



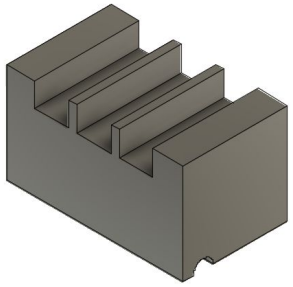
B: Bottom tunnels for cables storage (1.7:1)

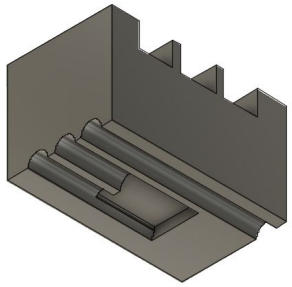


A: Top segments division (1:1)



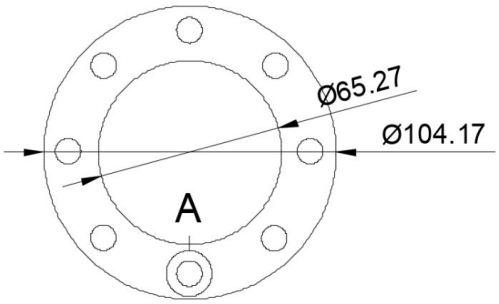
Isometric view



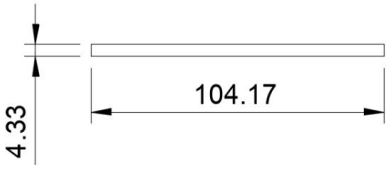


10. Bearing cage

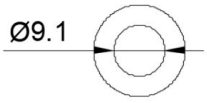
Top view



Right / Lift / Front / Back view



A: Hollow circle for ball bearing of 9.1 cm (1:1)



Isometric view

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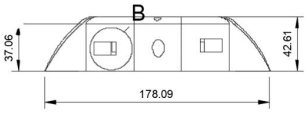
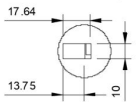
11. Base

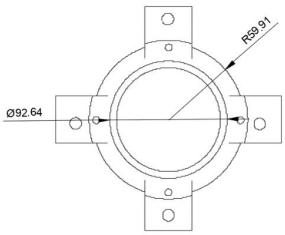
Front / Back / Left / Right view



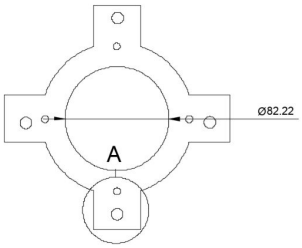
B: Hole for a USB port (1:2)



Top view

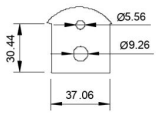


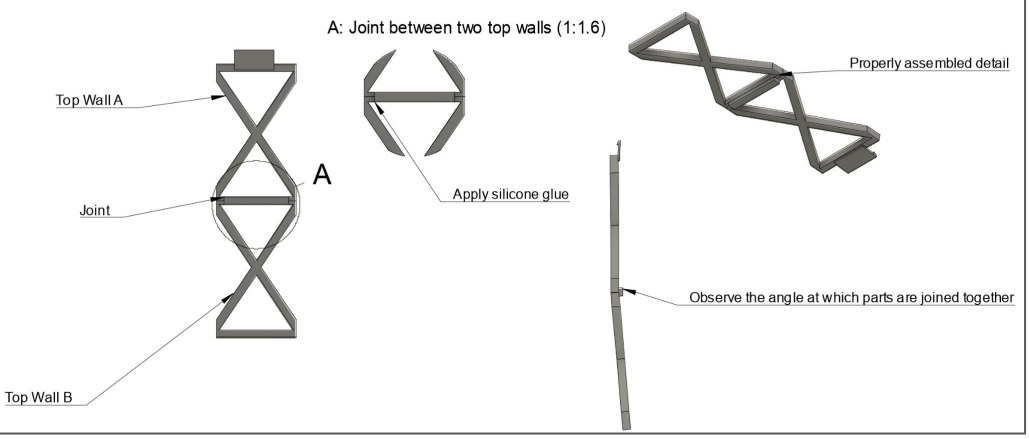
Bottom view

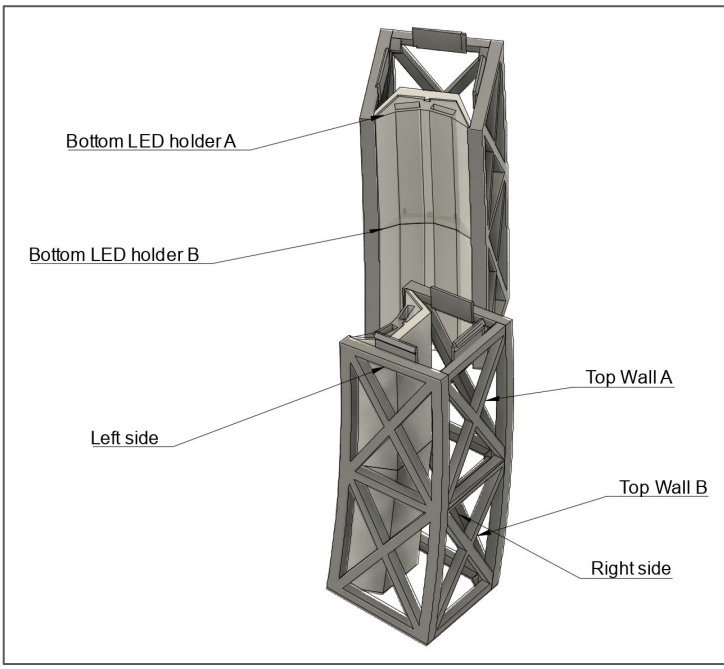


Isometric view

A: Base holes for screws (1:2)



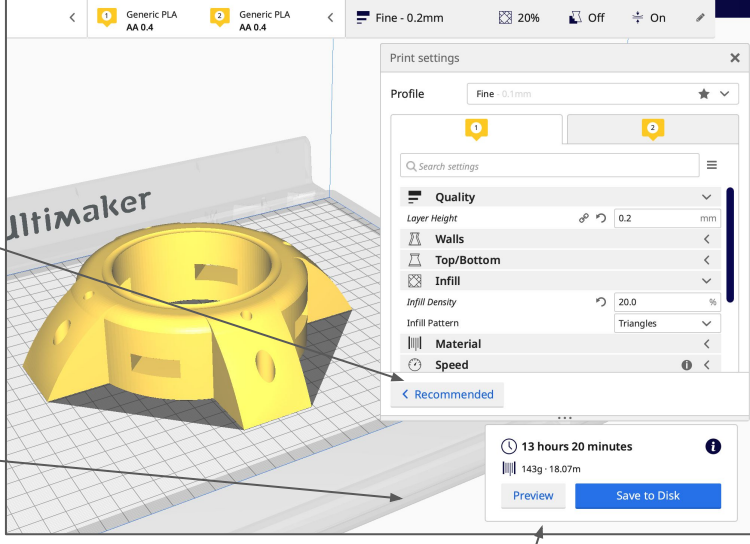

A: Joint between two top walls (1:1.6)
Top Wall A
Joint
A
Top Wall B
Apply silicone glue
Properly assembled detail
Observe the angle at which parts are joined together


Bottom LED holder A
Bottom LED holder B
Left side
Top Wall A
Top Wall B
Right side

Higher layer height & surface finish > lower speed of print

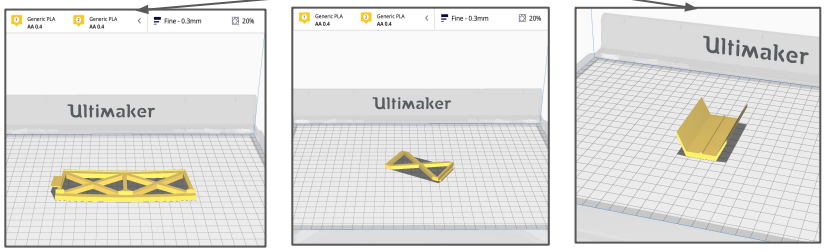
For most components, the layer height was reduced to 0.2mm. This enables for quicker printing without sacrificing surface quality.

Most components have a 20% infill, which provides for good endurance.

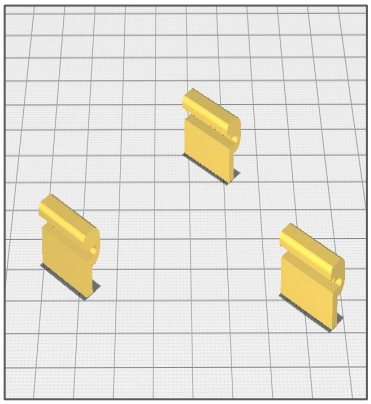


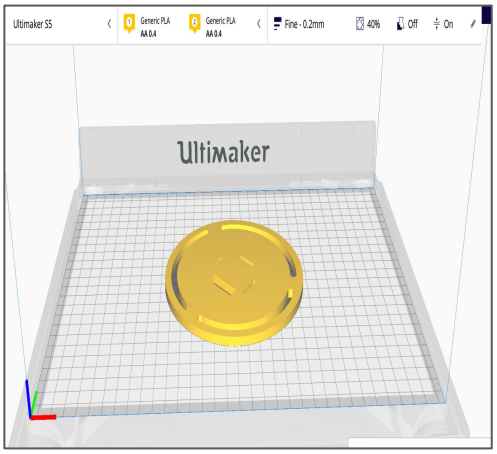
Print time & component weight

For these components, a higher layer height (0.3mm) is used to improve aesthetic characteristics (because they are exposed to the user)



Higher % infill for these components, which rub against each other (rotating base)





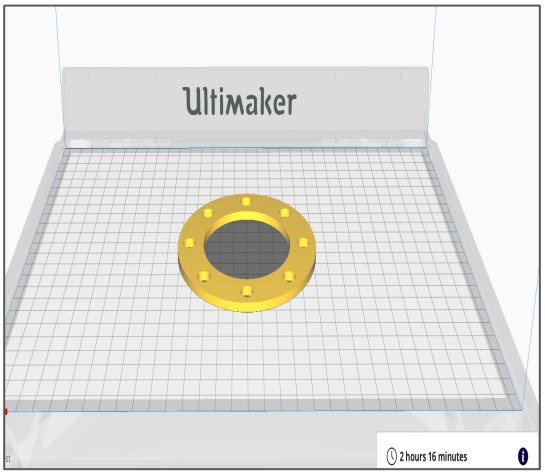


Figure 7

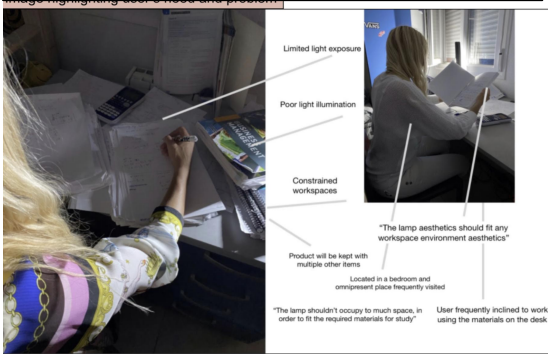
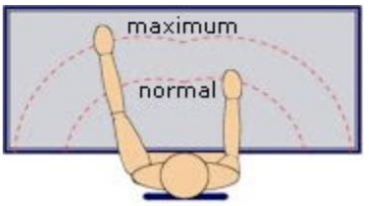


Figure 2



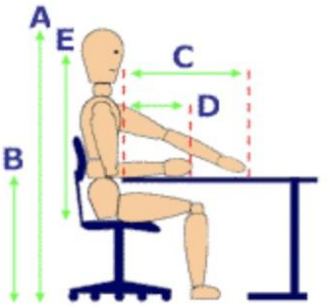


Figure 5

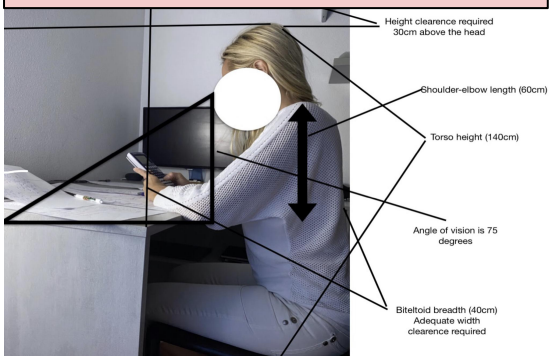


Figure 4

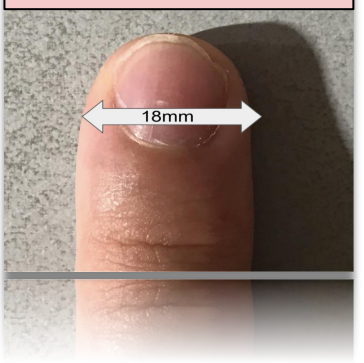


Figure 3

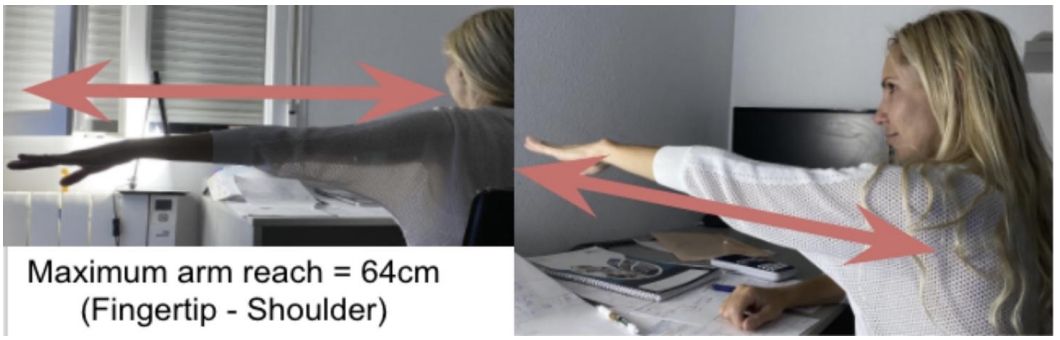


Figure 1

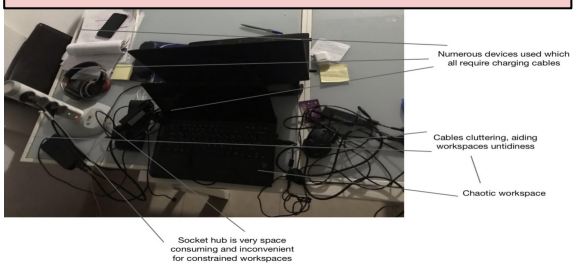
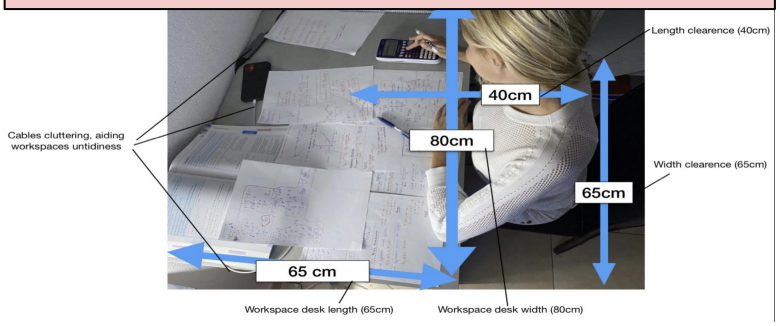
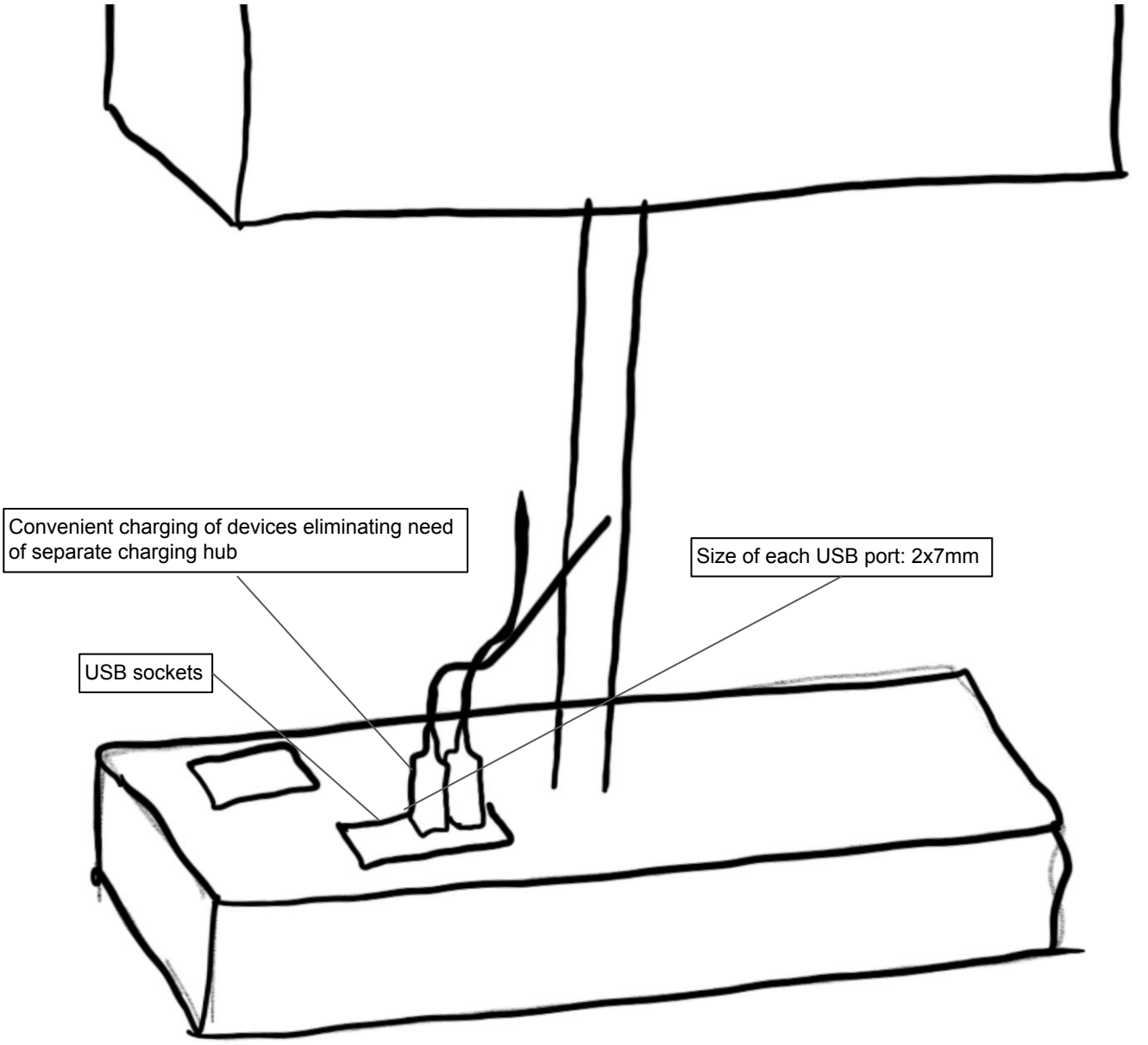


Figure 6




Convenient charging of devices eliminating need of separate charging hub
Size of each USB port: 2x7mm
USB sockets

Insufficient lighting problems

Publication

"Spending too much time in dimly lit rooms and offices may actually change the brain's structure and hurt one's ability to remember and learn" (Andy Henion, 2018)

Publication

"It's no secret that dim lighting can strain the eyes and cause headaches, lowering productivity and resulting in employee fatigue" (Jeff Pochepan, 2017)

Publication

"Poor lighting contributes to inadequate sleep, drowsiness, fatigue, stress, anxiety and even seasonal affective disorder. It significantly affects your mood, happiness, concentration and other cognitive functions like disengagement" (Light Research Centre, 2017)

- Poor learning productivity
- If the user isn't working comfortably, he isn't working smart
- If user isn't working smart, he isn't working to his full potential
- Hence, discomfort will cause poor sleep and fatigue leading to low productivity

Sufficient lighting benefits

Blog *(Christine Blume et. al., 2019)*

Good illumination has proven to help the users to:

- *Improve their concentration and cognitive functions.*
- *Elevate their moods*
- *Enhance their health and well-being.*
- *Reduce disruptions to their circadian rhythms and sleep cycles, helping them feel more refreshed the next day*

- Numerous benefits from working with high quality illumination

Messy workspaces problems

Publication

"In an increasingly paperless world, a spaghetti junction of tangled, trailing wires is often the main culprit for creating unsightly clutter in an office. This is down to the fact that desks are generally laden with a combination of computers, keyboards, laptops, phones and tablets." (CMD researchers, 2022)

Article

"We've found that people sitting at messy desks are less efficient, less persistent, and more frustrated and weary than those at neat desks." (Boyoun (Grace) Chae et. al., 2015)

- Excess trailing cables will cause workspace clutter
- Increased technology adoption results in greater quantity of charging cables covering desks
- Leading to increased frustration and stress resulting in productivity deterioration

Tidy workspaces benefits

Article

"Working in a clean and tidy working environment means you are less likely to be distracted by objects cluttering up a workspace, hence clean offices can lead to increased focus" (Sourav Basak, 2022)

Article

"Less time wasted searching for important documents, a tidy, well-organized office leads to a more productive day. In fact, searching for lost documents equates to businesses losing around $2.5 million in lack of productivity, according to data by the International Data Corporation." (Gabrielle Pickard-Whitehead, 2018)

Article

"The average person wastes 4.3 hours per week searching for paper, which increases stress and reduces concentration and creative thinking." (Pat Heydlauff, 2022)

Tidy workspaces aids reduction in user distraction and stress

Consequently, users are more concentrated and focused on the work

- Greatly aiding user's productivity and work efficiency

- Increasing user's ability to be creative and imaginative

Consequently, firms will benefit from reduced financial losses