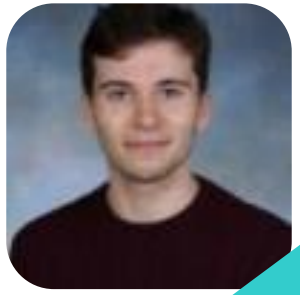
A2 PRODUCT

Design Project

2018-2019



Cameron Lester-John

INVESTIGATION OF CONTEXT AND POTENTIAL APPROACHES

Task analysis

For my product, I want to create a console table that can be seen more than just a piece of furniture. As well as being storage to traditional items such as: plants, books, lamps, keys and etc… I'm interested in designing it for items/appliances which we (as a population) use everyday. My main focus is going to have an item of furniture that is specialised to hold modern day technology (Smartphones, tablets, laptops and etc..). Through the designing phase, I'm going to include more convenient aspects that clients will appreciate – such as charging ports.

Marketing

After I manage to create my product, I'll also need to be able to market it efficiently where I know how to ensure the best profit and ratio between price and work time. Multiple production processes will need to be assessed, such as; One-off, batch, mass, continuous, and 'Just in time' production. Use of certain materials and tools will also be assessed/accounted for.

SUZIEHALL at Home

https://www.suziehallathome.co.uk/

When considering possible outlets for selling furniture, I discovered a few sites that take on other peoples newly made products and act as a selling platform for the creator/designer. This is ideal for saving time. For more commercial options, big furniture based companies/corporations will buy designs and lead into a mass/batch production – depending on popularity and ratings.

Problem 1: Size/Space P1

A main focus for my product is the consideration of space. It needs to be able to fit in any style/sized room. The objective is to provide a convenient solution for storage.

Problem 2: Aesthetics. P2

Currently, the majority of people are interested in modern and new unique designs – something that can separate them from others. My product needs to exceed this expectation and provide a modern/slick aesthetic that appeals to all (as well as it functioning properly).

Problem 3: Function. P3

There is an increasing number of the population that has modern, new advancing, technology. My product will apply to all. The main issue is ensuring the measurements fit, accuracy and precision will have to be key.

Problem 4: Accessories. P4

As a console, it is expected that most of them are able to hold extra items of clothing such as: Shoes, bags, jewellery, and coats. This needs to be considered through the designing phase (perhaps an indication of thought with extra storage space).

Problem 5: Durability: P5

This product is aimed to be the hub of the house. It will experience a lot of wear and tear as clients will be placing/taking items from it on a daily basis. Material and structure is key.

Problem Identity:

Throughout my project, I'll show where I've consider these problems with the following symbol.

P#

INVESTIGATION OF CONTEXT AND DESIGN BRIEF

Client Profile

NAME - Tamsin Emma Glyn
AGE - 23
LOCATION - Didcot, Oxfordshire.
INTERESTS - Clubbing, music, dancing, fast food, foreign foods (Chinese/oriental).
OCCUPATION - Contracts Specialist at 'Alere Toxicology' – and earns £23,000 a year (£1,916 per month).
Education – studying with online courses with biomedical science.

"When at home, I use my devices for almost everything – especially for my work. Sometimes I can't remember where I left them, which just leaves me wasting time trying to backtrack my steps. There isn't many options of furniture to choose from that can hold and cater to all my appliances".

Client Profile

NAME – Elizabeth Margery John
AGE - 55
LOCATION - Wallingford, Oxfordshire.
INTERESTS – Sewing, gardening, music.
OCCUPATION – Directing manager of 'AC Lester properties Ltd' (Landlady).
Mother of three, ages 17-24.

"I don't use my phone that often but I do like to take it with me when I go out so I'd like to leave in a recognisable place. Sometimes when I leave it in a drawer somewhere, it tends to get scratched on other items like keys and pens etc… I'd like to have a place where I can leave it charging and easily take it when I need to".

DESIGN BRIEF

Design Proposal

I am going to create a console table that will be able to hold a limited amount of modern devices and provide a solution of power/charging ports. Meanwhile upholding a new, modern, stylish, and unique design that can suit any/most households.

Design Criteria

- Stable and strong product of furniture that creates a simple solution for storage.
- Aesthetics should include a modern/new appeal – keeping colours simple and a continuous theme (minimum of three)
- Include a specialised aspect of storage that is especially designed for modern, everyday, technology

Target Market

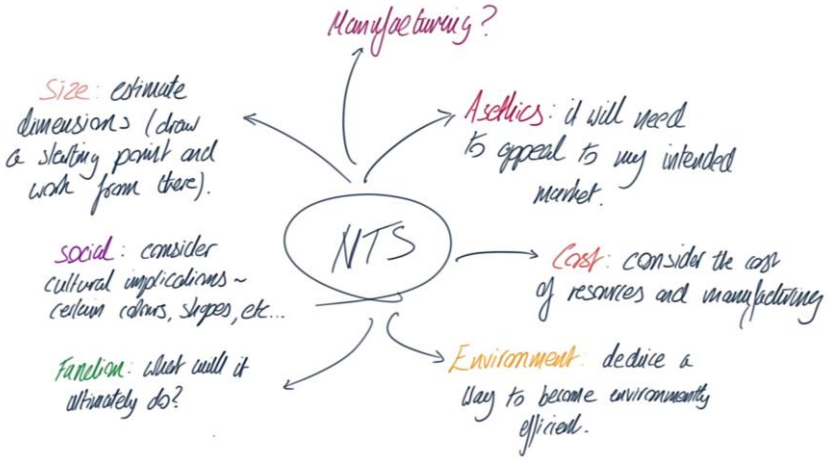
My product will be available for any person. However, it will mainly appeal for new home owners and/or current owners who would like a new solution for storage and modern design. Predicting that younger generations will prefer my design due to an upcoming era of modern design. People like new and innovative products – so to exceed this I will ensure my designing will withhold a variety of slick and appealing aesthetics. As well as being structurally sound and durable – people like long lasting products.

Potential Stakeholders

- End user
- Third party sale platform
- Material suppliers
- Off site component suppliers
- Manufacturing – if produced batch/mass production, will it be in the UK or abroad?
- Peer feedback – third party

Requirements from third party

- To be able to hold their devices and other essentials (like wallet, keys, etc…)
- To have the option to place in most rooms (Size)
- Be strong enough to hold most items (like books, decorations, etc…)
- Have a modern aesthetic.
- Have a component/mechanism that helps charge devices.
- Include a sort of hidden storage feature.
- Preferably lightweight, easy to transport.



NON TECHNICAL SPECIFICATION

NTS

Materials

I am mainly interested in making my product out of wood, because with wood it is easier to create curves and unique shapes than with metal. I wouldn't want to work with plastic – first, due to the lack of tools at hand. And secondly, the cheap aesthetic it has. Depending on what wood, the product can result in having a quality finish.

However, instead of working with hard/expensive wood – one could use veneer to cover cheap and recycled wood (MDF)

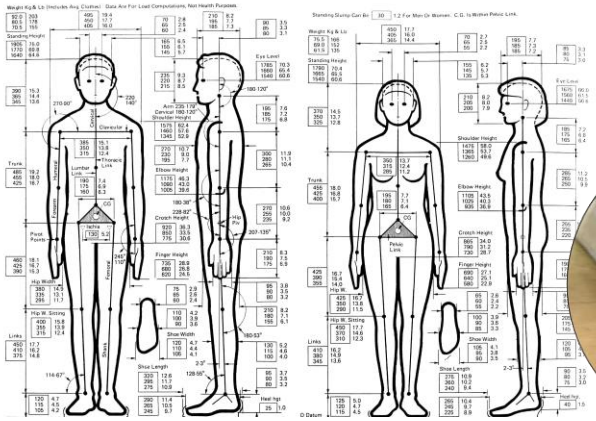
Size/space

P1

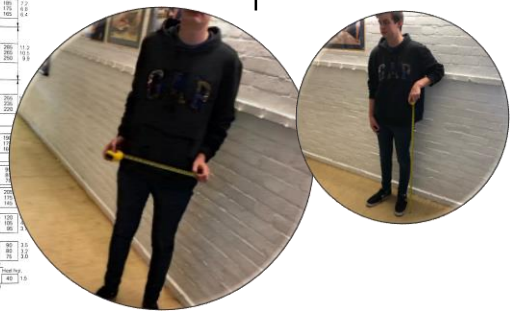
The size will be tall enough so it reaches a comfortable height compared to the average human. The width will be wide enough to cover a range of items.

H: 950 W: 1050 D: 350 mm

Rough guide line for when designing/producing



Constant reference



Aesthetics

P2

Modern, slick, new, and innovative design. Contrast between angular and curvaceous lines. Warm/harmonious colours. Deep, rich wood like mahogany, walnut etc…

Environment

Always refer to the '6 r's'

- Recycle – use recycle material (from existing/old products)
- Reuse – go back and use pieces of wood that you thought was waste.
- Repair – change designs to be more friendly towards the environment.
- Refuse – limit yourself to a select few of materials you know are harmful.
- Rethink – go back and evaluate your choices, consider alternatives.
- Reduce – cut back on materials, ensure there is minimal waste.

If end product is going to be mass produced, resources supplied will have to be analysed in order to discover the best and most efficient way for sustainability.

Cost

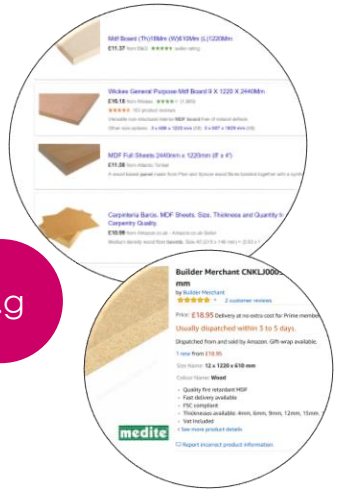
A base frame of MDF (recycled wood).

3 x 1220 x 610 mm - £17

A cover/finish of veneer.

Oak Wood Veneer Sheets 250mm wide - £12

E.g



Manufacturing

My final product will be created from given resources in school. Materials and extra resources could be ordered from external third party suppliers – especially for specialised parts (Charging ports).

Actual construction of the product will be limited to the tools on site. However, many of the existing tools cover a wide range of abilities – especially for slots and shaping.

Quality control

To ensure the best finish and final result, it is essential to check for flaws. As progressing through the assembly, I will keep ensuring all parts are going as plan – such as measurements, aesthetics, finishes, rough edges, uneven surfaces, etc…
All imperfections will be covered and kept to a minimal.

Social

Including unique features such as phone holders and useable charging ports makes the product useful and a need for some people, like my sample clients. Ensuring nothing eccentric/too expensive is used so the majority of people with different paid wages have access – minimise segregation.

INVESTIGATION OF MANUFACTURING & MATERIALS

Material/possible manufacturing

There are a few materials that could be considered when making a piece of furniture, such as, wood, metal and plastic (the main and most feasible options). With each different material comes a different technique – some materials offer better techniques.

Wood – Joining method O

With wood, there are many possible ways to join pieces together with slotting techniques - most wood joints use glue, mainly PVA and other certain wood glues.
This includes:

Finger joint

A finger joint or box joint is one of the popular joint. You use it to join two pieces of wood at right angles to each other.

Mortis and tennon

This is where a rectangular mould is fitted into a matching size slot. This joining method would only be useful for basic square builds/designs. If I wanted a unique shape, I wouldn't use this.

Metal

Metal is a very strong material, offers strong structure and a long lasting product. The ideal material would be Mild steel. It has a low carbon content, high resistance, cost effective, and recyclable.

Plastic

Plastic is often used for short term and cheap furniture. My product's intention is good quality and long lasting.

Pine: soft, white or light yellow wood which is light in weight, straight grained. It resists shrinkage, swelling and warping.

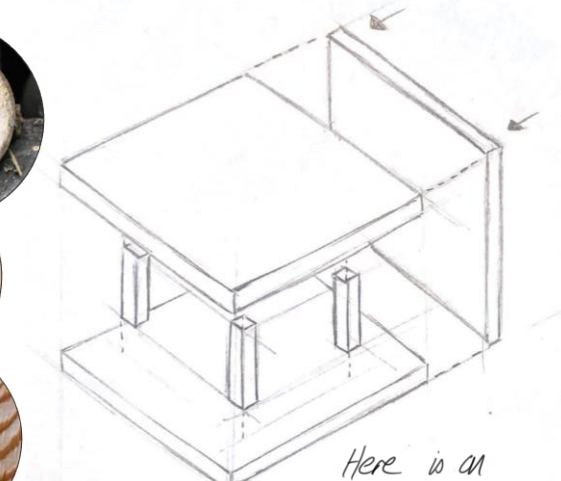
Ash: heavy, ring porous wood. It has a prominent grain that looks like oak, and a white to light brown colour.

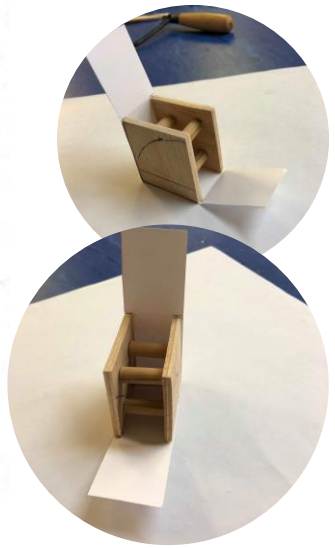
Beech: hard, strong and heavy wood with tiny pores. This relatively inexpensive wood has reddish brown heartwood and light sapwood.

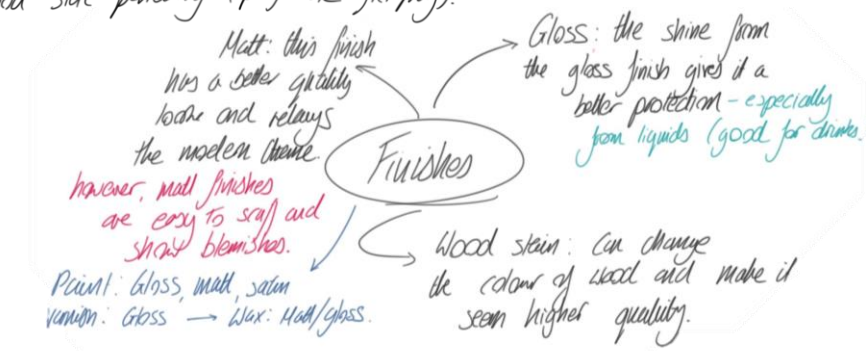
Cedar: knotty softwood which has a red-brown colour with light streaks. Its texture is uniform and it is highly resistant to decay and insects. It is grown in Kashmir and Assam.

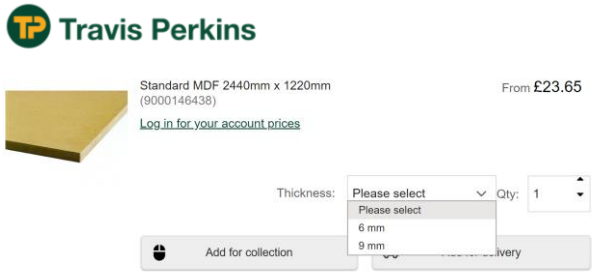
Spruce: strong and hard. It finishes well and has low resistance to decay. It has a moderate shrinkage and is light in weight.

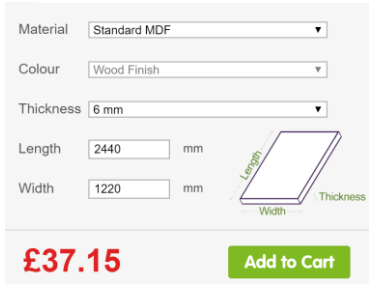
Oak: heavy, strong, light coloured hardwood.











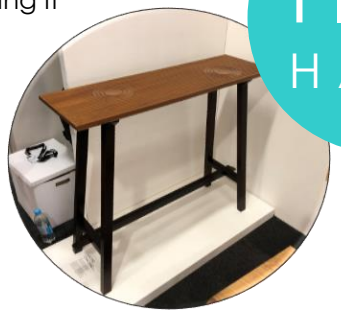
SECOND/FIRST HAND RESEARCH

Modern

The three photos above follow the same style/theme. Quite cubic and square – including a lot of right angles and such. However, it shows to be quite effective due to the colours used and the finishes.

For example, the first product has a gloss/chromic finish giving a flashy/shiny aesthetic – making it seen expensive.

Here I gathered some first hand research when visiting a new designer's exhibition. Both products here show some modernism, however the complexity varies… For example, the left product follows a traditional/minimalistic approach whereas the other has a more unique and innovative aesthetic that explores form and body.



FIRST HAND

Deep, rich colours tend to feel more expensive and stylish. Most likely due to how it mask dirt/dust.

The modern products would probably appeal to the younger market – due to it recently becoming the next style/era.

Most wooden furniture can be expensive due to some of the finishes you can get and the type of wood. Also, one-off products are usually made from wood meaning the product tends to be more valuable.

The product above has been created purely out of old recycled wood from various places. Doing so myself may make my result more aware for the environment and even cost – using furniture/products that have been thrown away.

Traditional

These photos on the right all follow the traditional theme/style. They are all made from wood and include a mixture of squares bases/structure with more round and extra features.

Another common trend with this style is that they all include a closed/hidden storage area such as draws and cupboards. Whereas the modern product follow more of a simple/open style when the clients possessions are on show.

Manufacturing wise, the traditional tends to include more components that include the use of different slotting/joining methods.

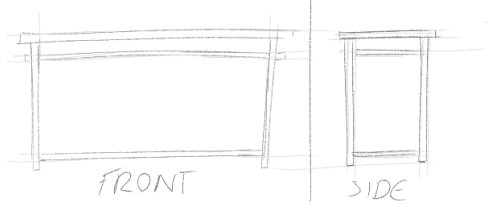
Most of the traditional products use thicker and more durable wood. For example the legs on these tables are generally bigger than the modern.

FIRST HAND RESEARCH

This table on the left is a good example for a product that has used mild steel. The steel is mainly used for structure and frame. This product has a very common shape – not innovative.

The width of the table is also quite large, in my design it will be smaller to accommodate most households. One advantage to this product is that It uses the space beneath it to give extra storage space.

Here I sketched both the front and side of the table to demonstrate how the design appears too rigid and in too constructed with right angles/ straight edges. The product doesn't have any secured storge (e.g. drawers) – meaning items could just fall off.



The selection of tables on the left are mainly being used for a more utility purpose. It allows the user to pull around due to added wheels. This table is purely used for function and there is no attempt to improve aesthetics. Basic shape.

The marble top styled table portrays a modern theme by using solid block colours (black) with a bit of expensive looking stone. Stones such as marble are more desirable. This product is noticeably the most expensive one.

This console table has a unique appeal. It appears to be constructed from an ash wood material. The various shades suggest that the product has been assembled by recycled wood. This is a good idea when considering the environment – using old/unused wood can be beneficial and appeal to a large audience within the younger generation.

This table follows a ordinary square design but as seen in the picture, it is well suited for its function which is to hold records and a record player. Having the waxed wooden finish gives the product a classic look that is well suited for its environment. However, In terms of 'innovation' it lacks the potential.

The picture above represents a more interesting approach. Again the structure is basic/common however the colour gives the product a more vibrance and an attractive style – makes it more recognisable.

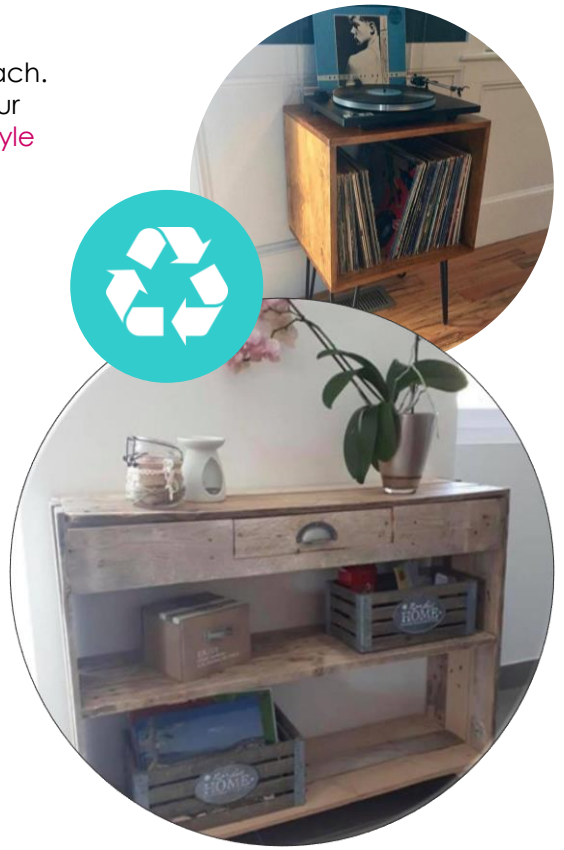
Next steps…

Before I move even further, I need to determined what to gather from this research and determined the next course of action…

Key points…

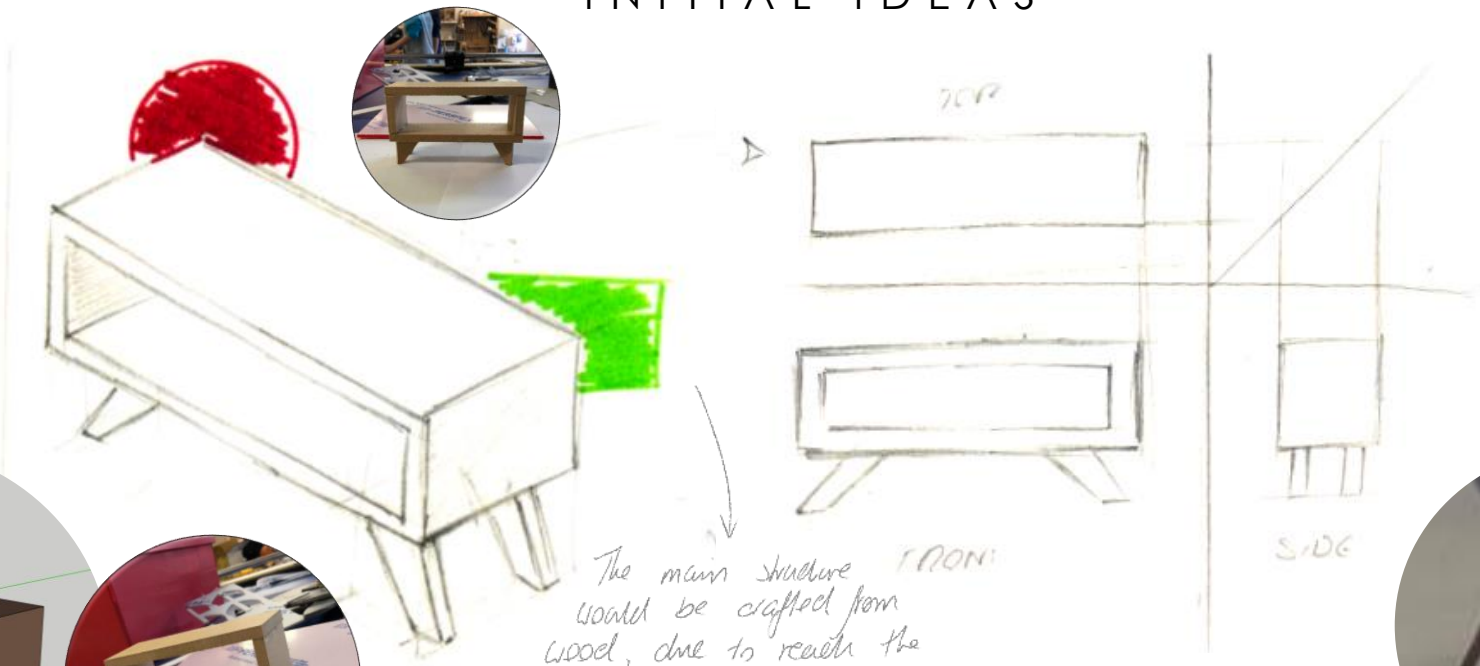
- Modern products tend to be more minimal, thin, and right angled
- Gloss finishes provides a better quality finish
- Wood produces a warm vibe/environment
- Darker colours seem better quality (hides dirt and blemishes
- Some better looking products sacrifice their ability to function as something else
- Some product only look good in certain settings/environments.

These points have helped me gain a better understanding of how I am going to initially design my product.



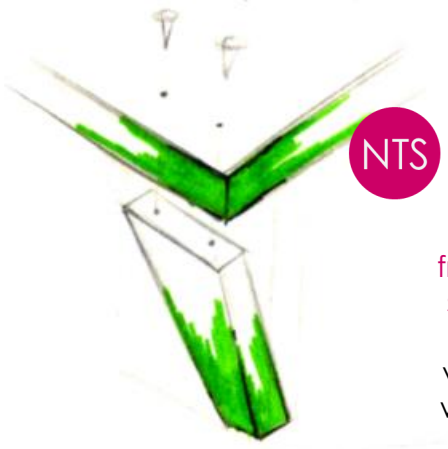
INITIAL IDEAS

For my first initial concept, I thought about designing something quite simple and practical – a product that many people may own and/or have something similar. This was a good starting base for my future ideas.



MODEL

Here, I sketched an exploded isometric to try and figure out how the feet/supports could be connected to the base of the structure. Initially I thought of creating some sort of joint to slot and glue together, however, I concluded that it'll be more practical to save time and perhaps use a couple screws instead (as well as using glue).



NTS

For this product I thought I'd use the colour green. This is due to some of its many meaning such as; renewal, nature, freshness, energy, and safety. Most relate to the environment – a very popular element which people look for nowadays.

Providing all possible elevations of the design helped ensure I knew what the dimensions may be and more of an overall thought of how I could create the product, if I were to consider this as my final.

I started to edit the possible structure by adding some more angular edges by rotating the feet/supports. Above is a more established idea – second hand research

Next steps…

For my next idea I will:

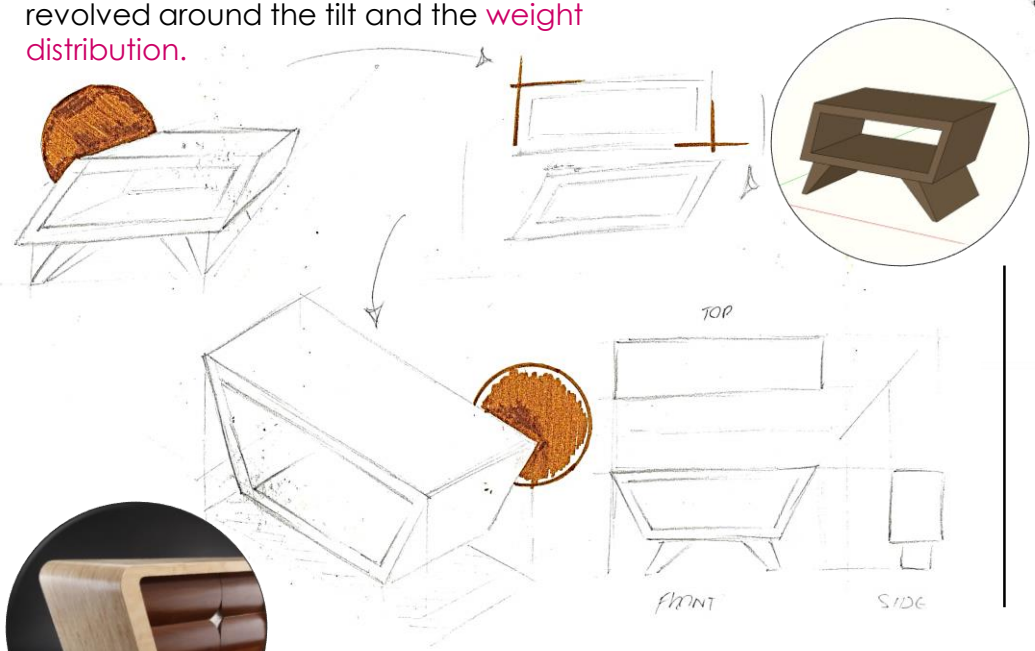
- Develop the shape/figure
- Consider a wider breadth of colour/tone
- Explore the more minimal theme.

INITIAL IDEAS

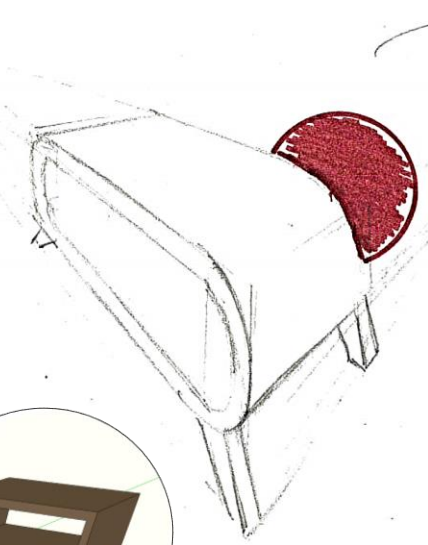
Here, I sketched a few more possible ideas, following the same type of structure as the first but changing the overall shape and appeal. For the sketches located on the right, I tried including more curvature by rounding the edges – creating more of an ellipse.

Towards the bottom, on the left, I took the sharp angular body and played with it. I tested with a couple shapes such as a parallelogram and a trapezium. The parallelogram was initially a unique idea but offered a few structural problems that revolved around the tilt and the weight distribution.

P2

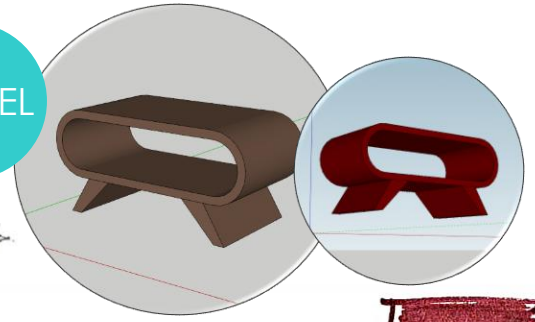


I thought these ideas had a more retro aesthetic. So when I decided to do a little more research, I discovered a similar product to what I had in mind



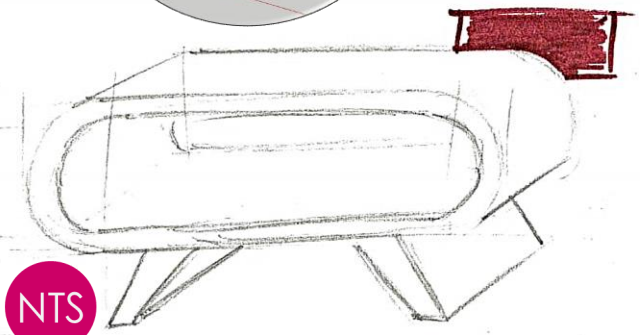
One of the main reasons why these pieces are separate is due to the safety. The curvature on the right provides a more sooth and protective edge whereas the design on the left do not. Could be a possible hazard.

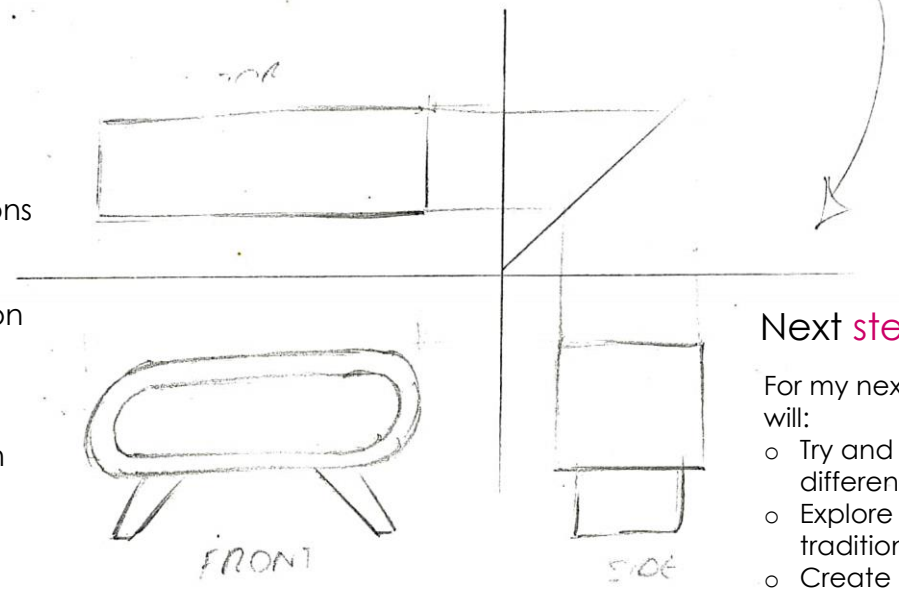
MODEL



I changed the legs from being four to two by stretching them out. Here I thought it made the product look more unique and modern.

NTS



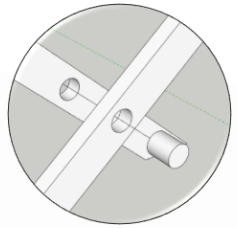


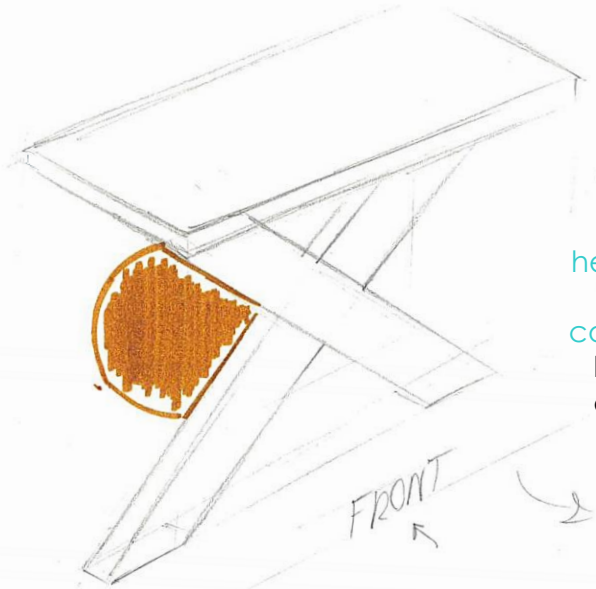
Next steps…

For my next idea I will:

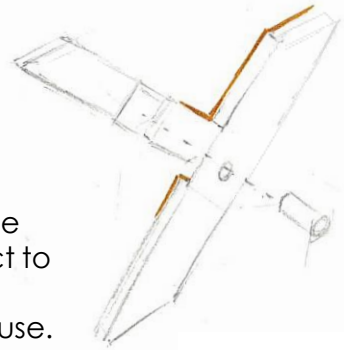
- Try and play with different structures
- Explore the more traditional side
- Create a primary model

INITIAL IDEAS

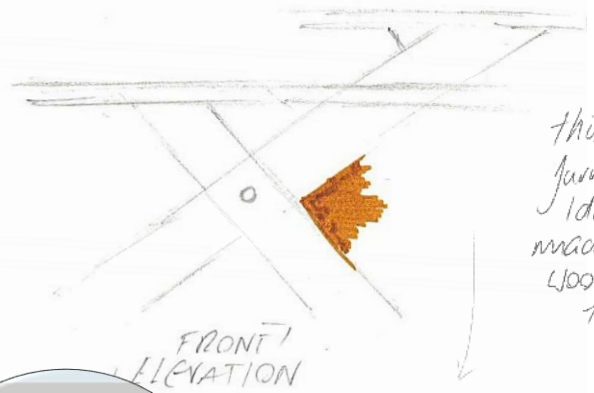




I have elevated the height of the product to make it more convenient when in use. I've tried to keep the aesthetic modern by minimalizing and keeping it simple.



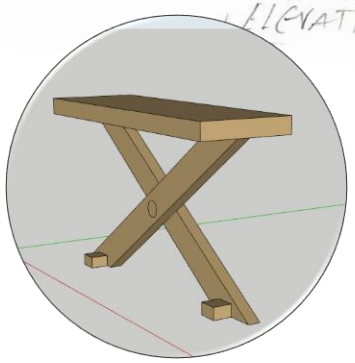
Extending one of the supports can help add another shelf



this style of furniture would ideally be made from wood - to keep the traditional theme

The two supports would be joined with another piece of wood that resembles a cylinder - attached with glue

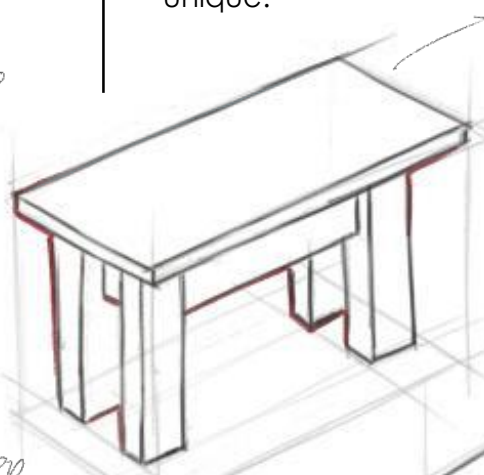
It became clear that the product wouldn't be able to balance with just those two supports, so I decided to add a cuboid at the bottom of each feet to produce more stability.



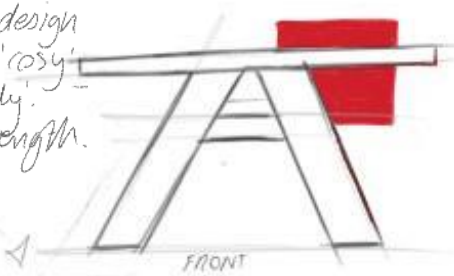
P2 NTS

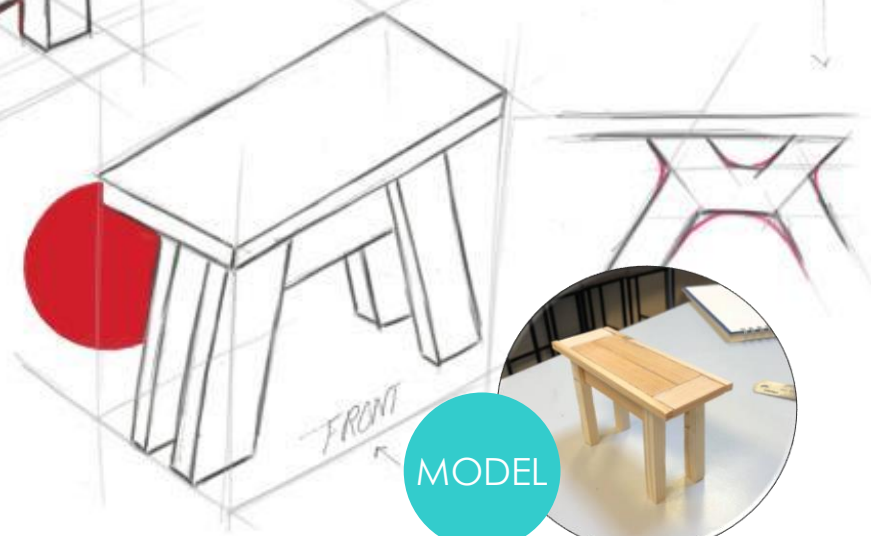
Here I first designed a more iconic/traditional table that appears to be a more common product – seen in the majority of furniture retail. I took that design and started to manipulate it by twisting/turning some edges to make it appear more unique.

I then took some of the angles in the body and thought to create a more round and smooth looking piece. The lines give a more 'loose' look and provides more curvature in a sharp looking product.



popular design appears 'cosy' and 'homely'. reliable strength.





INITIAL IDEAS

Next steps…

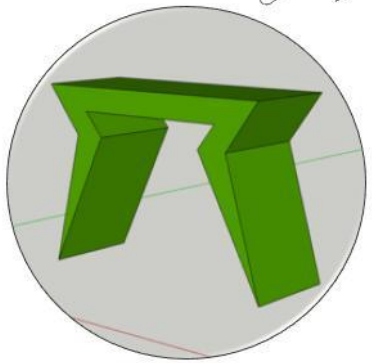
For my next idea I will:
- Consider different materials
- Consider different manufacturing processes

The table top would be a solid plank of wood perhaps oak

To further develop the design I thought to simplify it even more by making it look like a single piece

P5

For this design, I wanted to make it a little different by choosing another material for the base – metal. It creates a stronger base and provides a more minimal design.



P4

I decided to try and use the most out of my product by adding a second layer, a shelf beneath the main table top – it can help store more items like keys, books, letters, etc…

END USER FEEDBACK

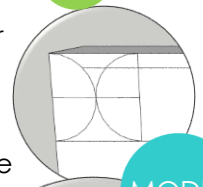
P2

Here, I asked my end user to give me some advise and how to progress further from the last design. They said: "I like the design but it seems to lack some curvature"

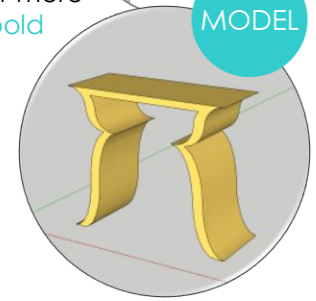
I played more with thin and thick edges by combing them. Having a thin top and bottom layer of the table surface with thicker sides. The lines appear more wavy and bold

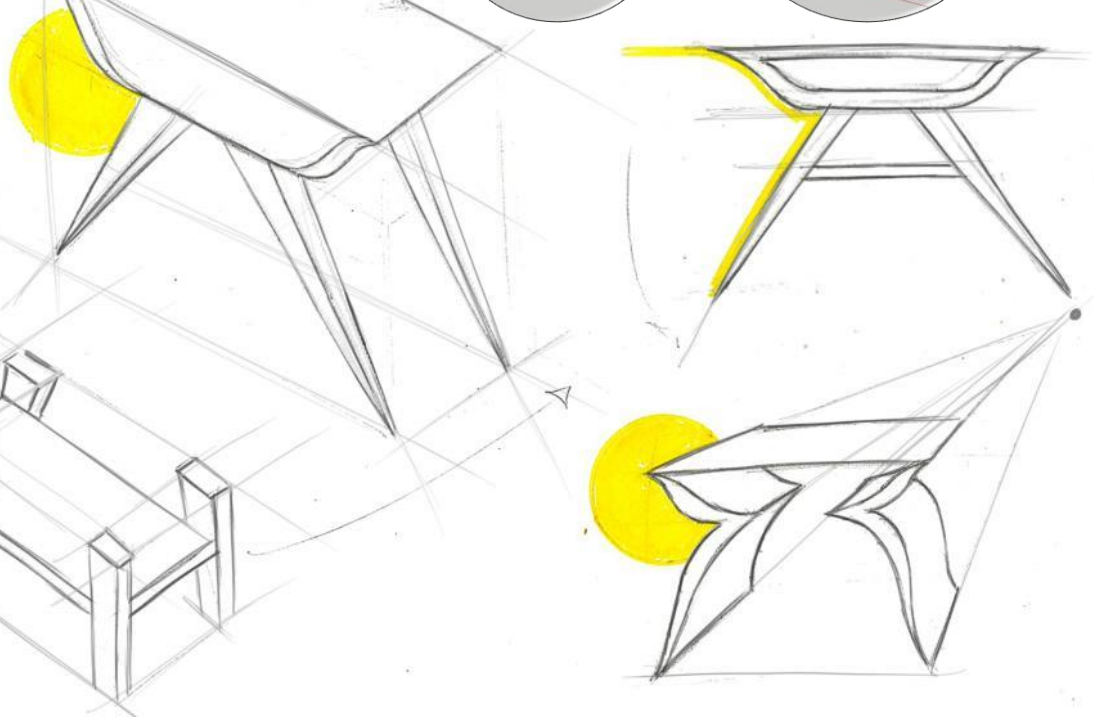
NTS

P1



MODEL





INITIAL IDEAS

For this particular design I gained inspiration from the various other designs in my collection so far. I have included the retro style trapezium on top and the slick, sharp, pointed legs. The product brings a certain level of boldness and elegance, most definitely countable as modern.

P2

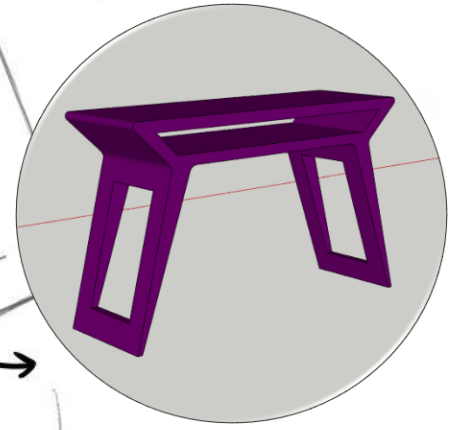
However, as stylish as it may be, the edges appear quite sharp and could be a potential hazard – especially if someone were to fall next to it (most children would be applicable do to their height – at eye level). So I repaired it by rounding off the edges.

P5

I was thinking a finger joint would be ideal but it would have to accomodate the curve of the edge.

It would have to made from a strong hard wood like oak.

I thought I'd include one of my first ideas where I stretched the width of the legs, however I wanted to add something extra, so I changed the frame by placing a hole in the centre.



rounding the edges by a little gives the product a more professional look - Jasper as being modern.

P4 P3

Adding a little compartment may provide a more secure storage alternative.

The pattern includes a tessellation technique.

I started to explore the possible patterns I could include on the side of the legs. This geometric/triangular style appeared to be quite effective and give a strong fine aesthetic.

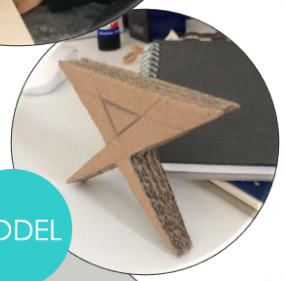
Next steps...

For my next idea I will:

- For the next few pages I will try and focus on a couple past designs and develop them further to help decide a final design.

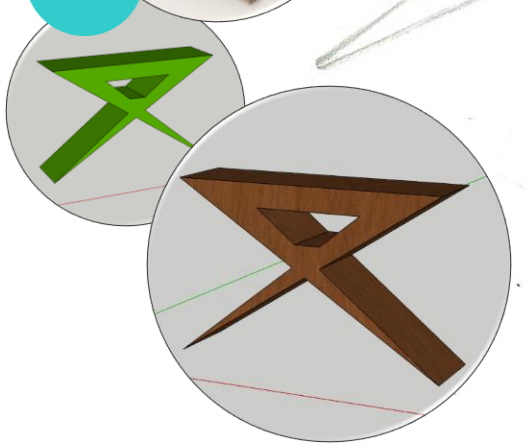
IDEA DEVLOPMENT

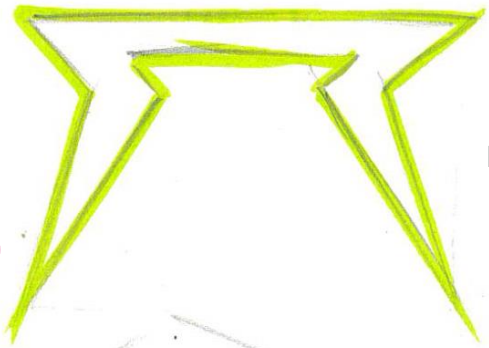
I chose this initial design to develop further because I liked the sharp angular aesthetic which showcases the modern aspect of the product.



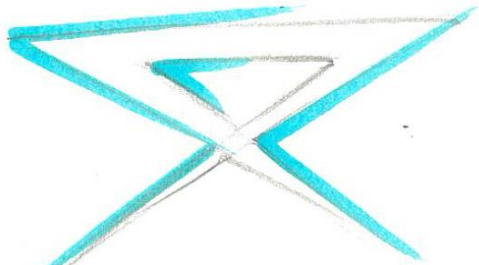
THIRD PARTY FEEDBACK

MODEL





Blue represents both the sky and the sea, and is associated with open spaces, freedom, intuition, imagination, expansiveness



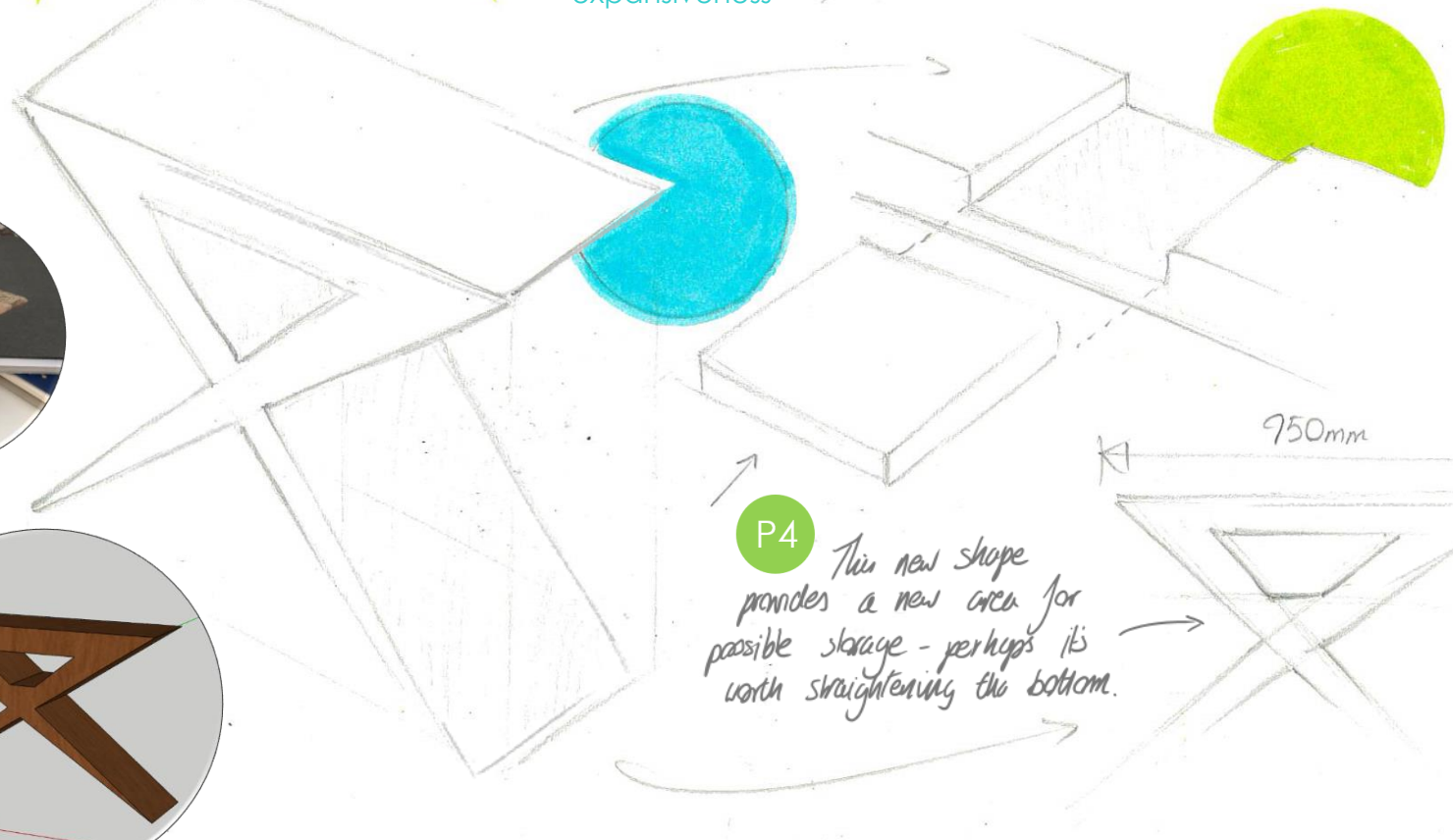
In this concept, I kept the broad/bold lines but only changed the shape/body. I was looking for a way to increase the appeal and have a more unique form. In the initial design, the form of the angles reminded me of the letter 'X' so I literally turned it in to an 'X' figured table. In my opinion. I found the result to be pleasing – aesthetically.

P2

P3

Here I thought of adding a small compartment, ideal for the smaller items around the house, like keys, money, etc...

There would be a seperate block of wood that slides into the frame.



P4

This new shape provides a new area for possible storage - perhaps it's worth straightening the bottom.

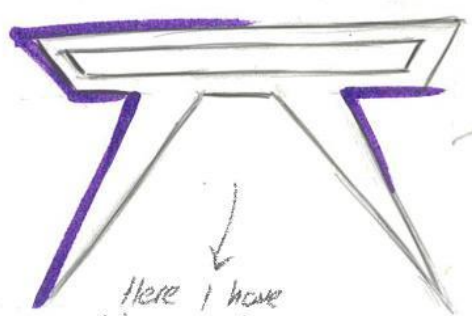
Est. H:950 W:950 D:350

Height: Width: Depth (MM)

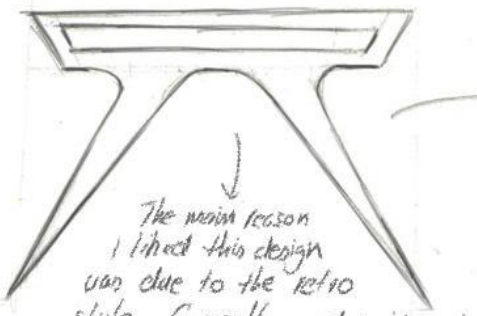
P1

While sketching, I was deciding/imaging how big I wanted the product to be. In the end I tested with a tape measure and though 950mm would be an applicable size for the width – to ensure the surface is big enough for storage.

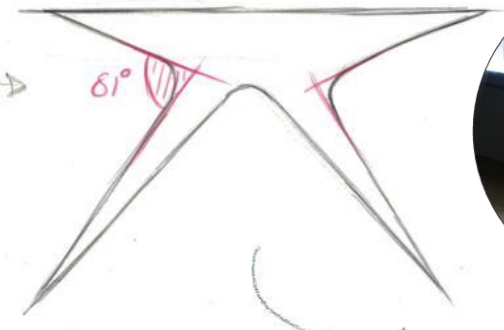
IDEA DEVLOPMENT



Here I have taken another one of my favourite designs to develop further - perhaps include is shape / body into my final product.



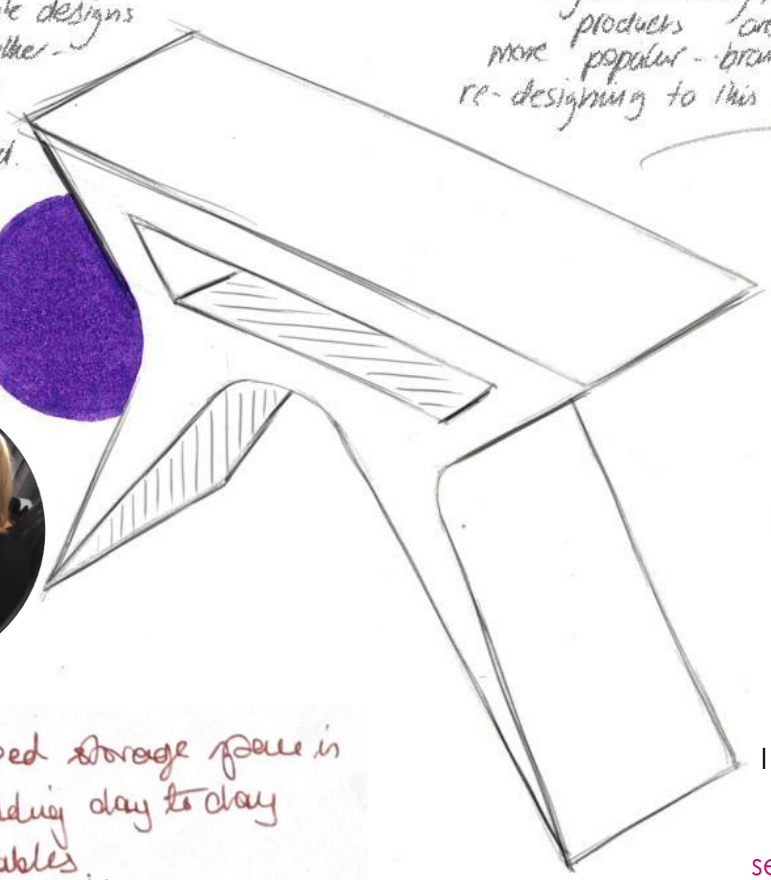
The main reason I liked this design was due to the retro style. Currently, retro items / products are becoming more popular - brands are re-designing to this need.



P2

I wanted to make the product appear more smooth and less harsh to the eye. taking lines away and curving some edges achieves this.

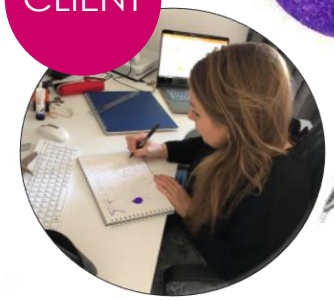
Here I researched a few more items online that have similar features to what I'm attempting my product to look like. Hopefully I can reflect the modern angles and edges.



P3

Here I have tried a different approach of including a small storage space for more precious items one would keep.

CLIENT

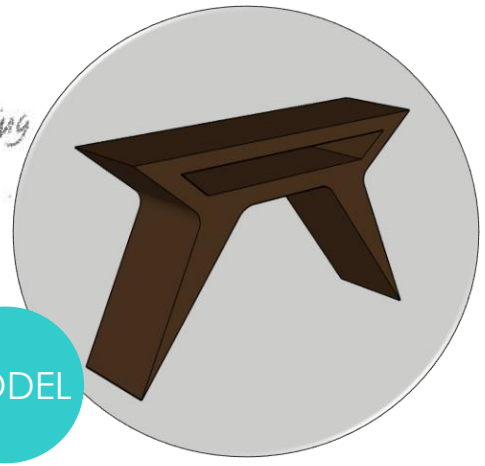


"The enclosed storage space is ideal for holding day to day valuables"

I want to try and produce a final outcome that that includes an aspect that secures the clients valuables, like a drawer.

P4

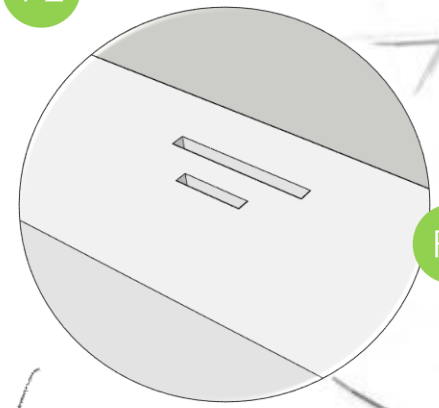
MODEL



FINAL PRODUCT DEVELOPMENT

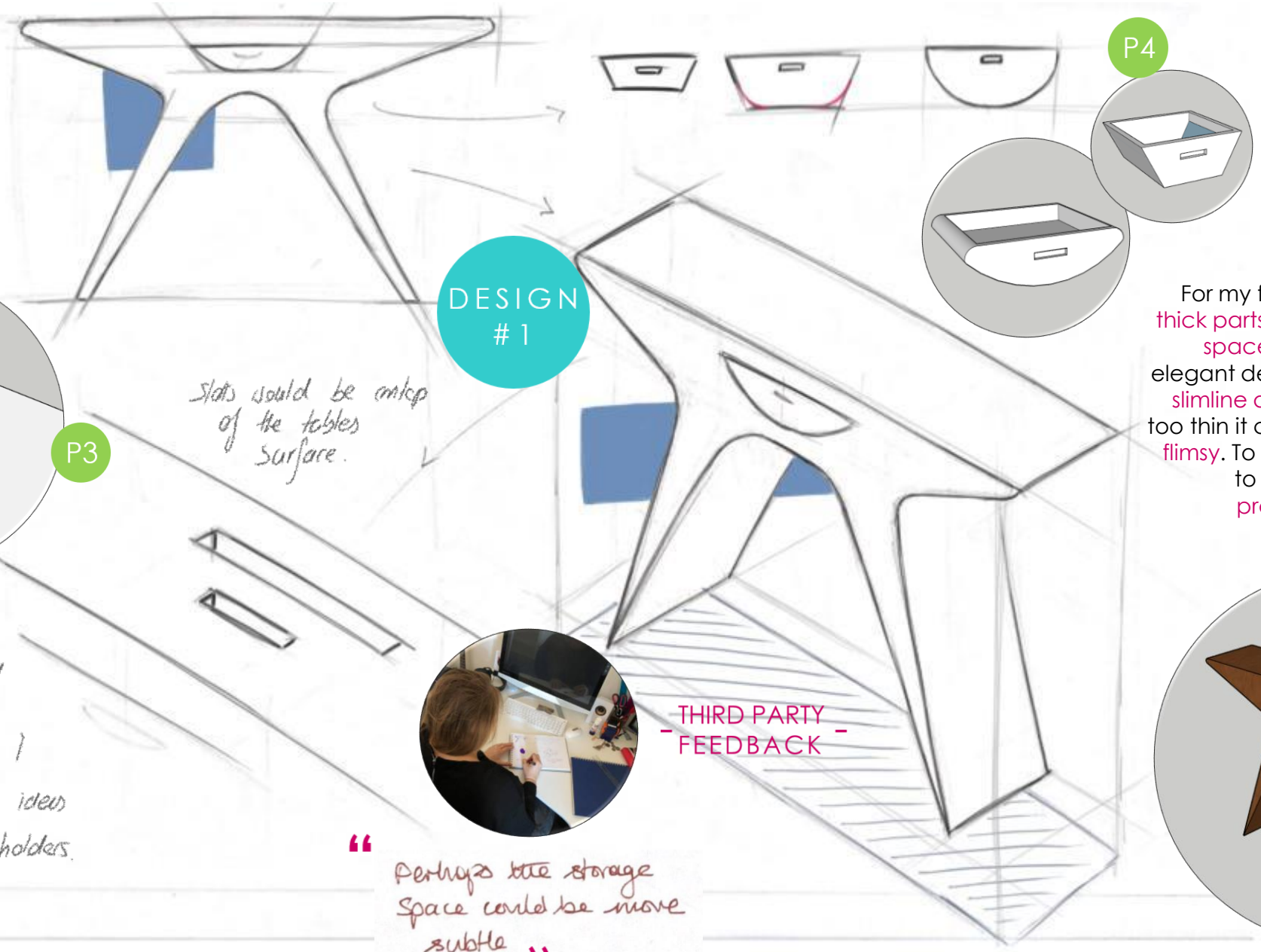
I chose this for my base for developing my final product because overall its frame has a unique aspect with a modern style that reflects the ideal picture of innovation.

P2



P3

For the original specification I wanted to table to cater electronic devices. So I added some initial ideas of possible slot / holders.



P4

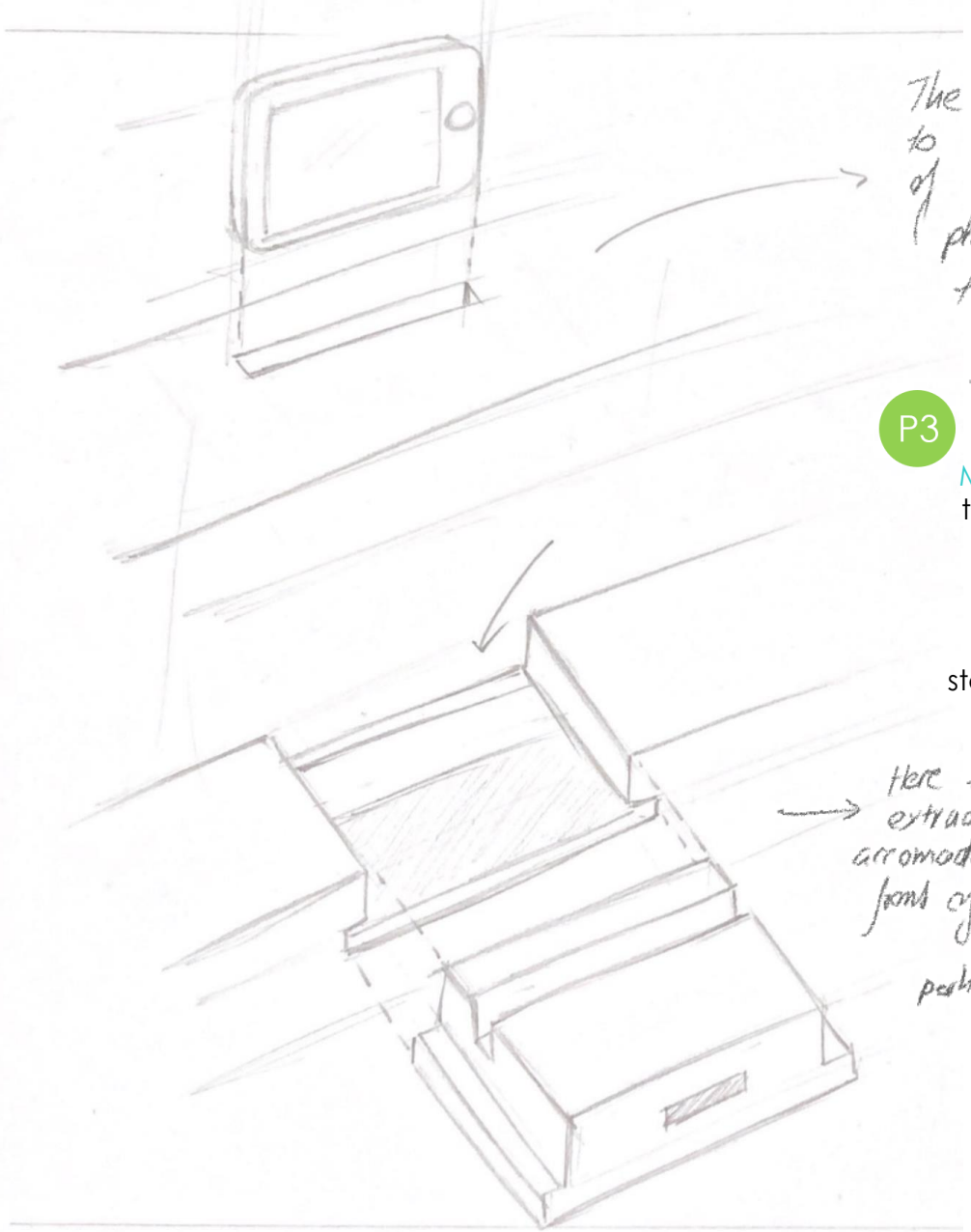
I wanted to develop the storage space by practicing the shape. Overall I perfered the half circle, it matches the rounded edges and the overall smooth theme of the product.

For my final product I don't want thick parts of blank empty wooden space. I want a more slick and elegant design with thin widths and slimline aesthetics. However, If it is too thin it could appear cheap and flimsy. To overcome this, I will have to experiment with different proportions and the ratio of measurements.

THIRD PARTY FEEDBACK

"Perhaps the storage space could be more subtle"

FINAL PRODUCT DEVELOPMENT



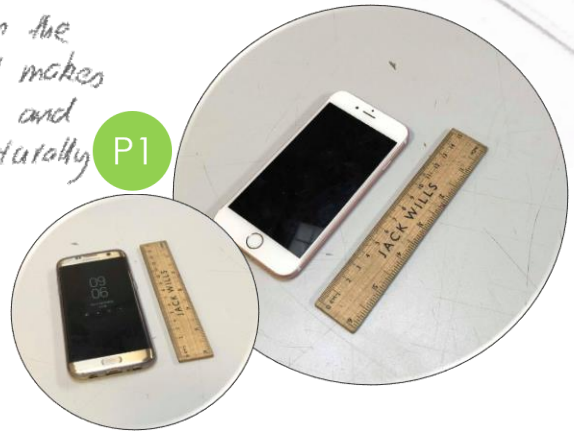
The slot on top needs to accomodate majority of devices ranging from phones to tablets, however, the holder can't be too large because it could turn the surface into an eye-sore

P3

My client gave me advice on how to develop the storage technique to help cater her own living. This would help reflect what people around her age would look for in such a product. She wanted the storage to appear more subtle – like a secret compartment.

Here the block has a extruded bottom that accomodates the slot in the form of the table, it makes it more secure and perhaps more structurally sound.

FIRST HAND

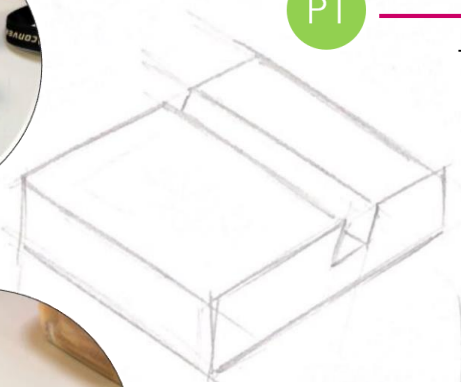


P1

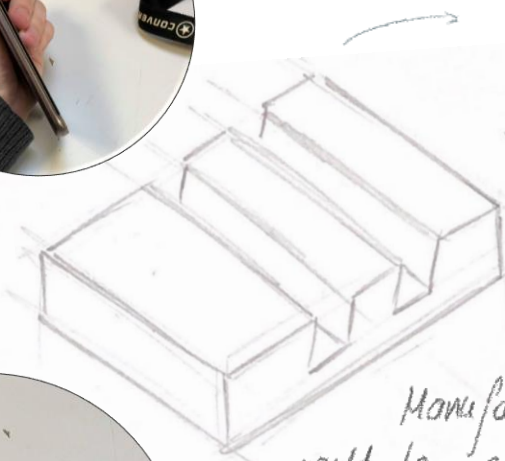
Est. H:20 W:300 D:15

Height: Width: Depth (MM)

The height would be the amount it goes down into the wood, width is how far it stretches and depth is how thick the hole is.



adding another slot may give better access to holding more devices.

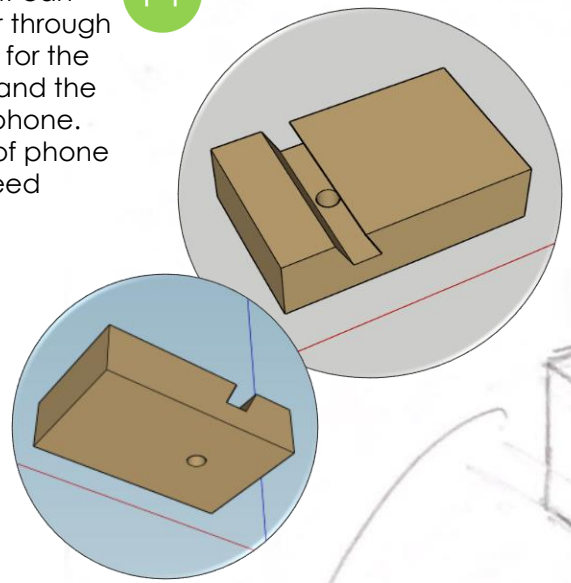


Manufacturing wise, it would be easier to use a block of wood that fit the table and cut inwards from the sides to create slots for the electronics.

FINAL PRODUCT DEVELOPMENT

Here I needed to design a gap/hole that can feed a charger through it – big enough for the charger head and the socket for the phone. Multiple types of phone chargers will need consideration.

P1



The wire will have to be fed through a hole in the back of the table. The slot will be at the back of the table where the storage part is so it can go under the removable block. The purple arrow in the sketch shows the path which the cord will follow. However, a typical charger from any phone probably won't have the correct length from the top of the table to the floor for a plug socket.

P3

P4

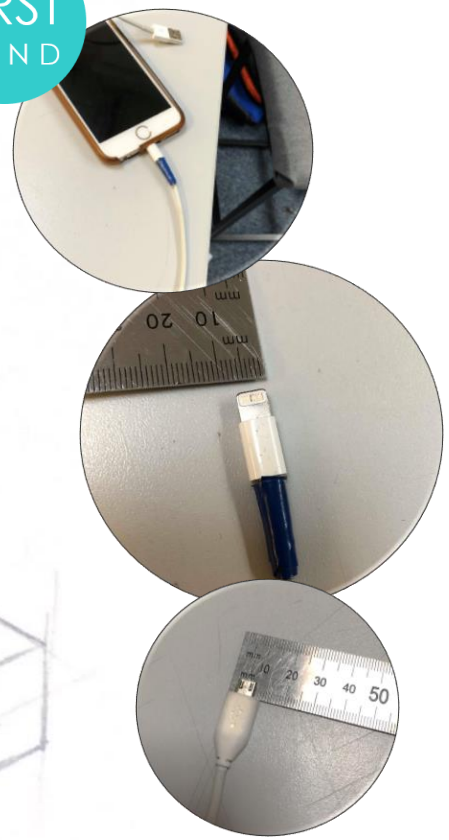
This diagram shows where I will position the hole. The charger will hold the phone in place aswell - to ensure that it is less likely to fall if the table was nudged.

TOP

There will be multiple holes for charging more than one device.

The 'pilot hole for the chargers will be around 20mm - most sizes of the cable ends would fit through holes with a diameter of 10mm, others would be 10-15mm (no more).

FIRST HAND



Above I got some first hand research of certain measurements for both android and iPhone chargers. The iPhone charge averaged with a width of 10mm and the android had a 13mm.

FINAL PRODUCT DEVELOPMENT

For this page, I wanted to extend the design by changing the style and try to create something more innovative. Do achieve this, I thought to add some irregular lines/shapes – intending to create something that looks new and unique. I think the straight, jagged lines produces a more dynamic shape with a slick, sharp, design.

P2

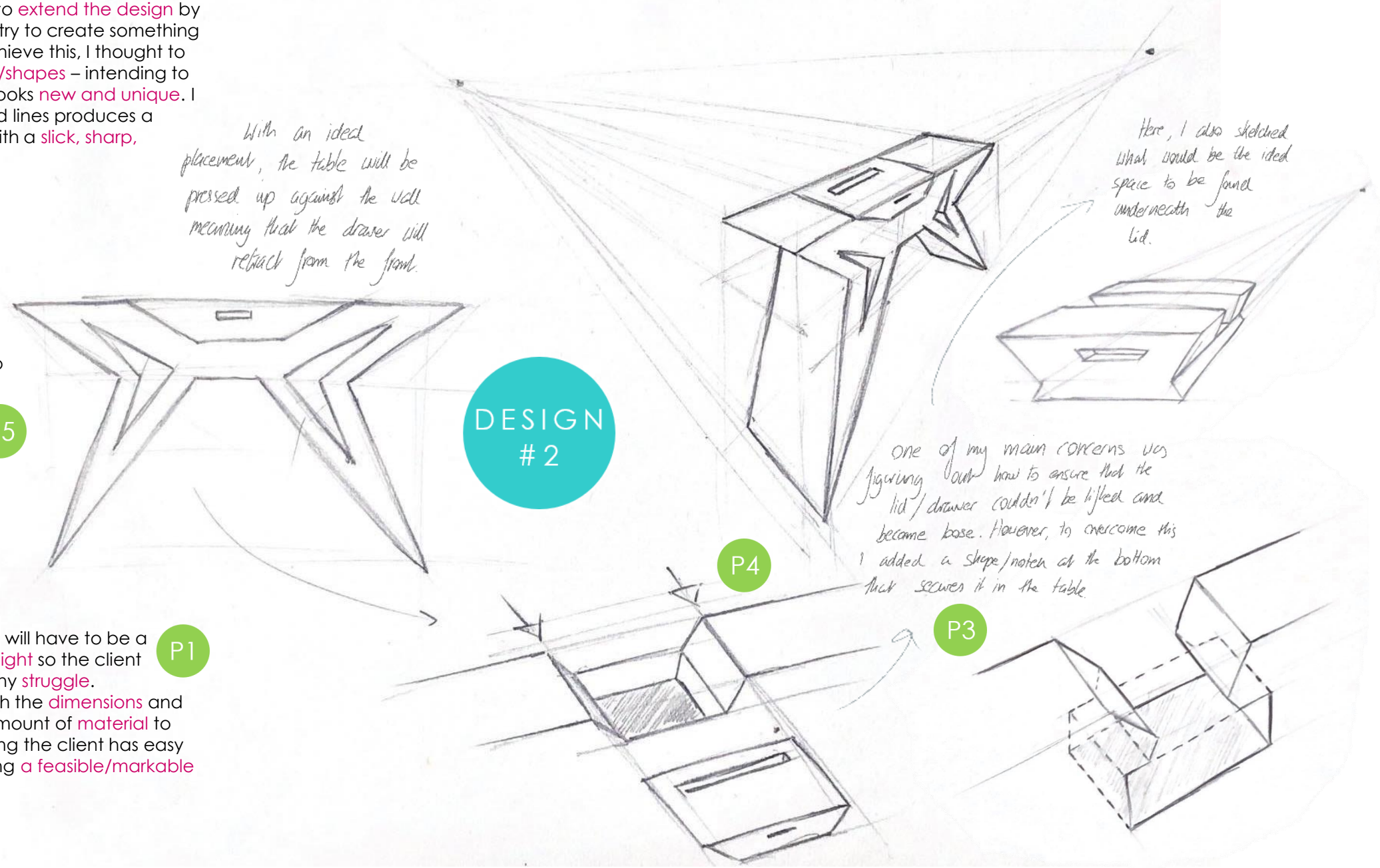
I have still kept the base shape for what I want to develop. However, due to the new design, I have to revisit the storage component and determined a way to secure the top from being loose/falling off.

P5

The size of the drawer/lid will have to be a comfortable size and weight so the client doesn't feel strain and any struggle. Furthermore, I will test with the dimensions and determined a suitable amount of material to reduce heaviness. Ensuring the client has easy access is key to producing a feasible/markable product.

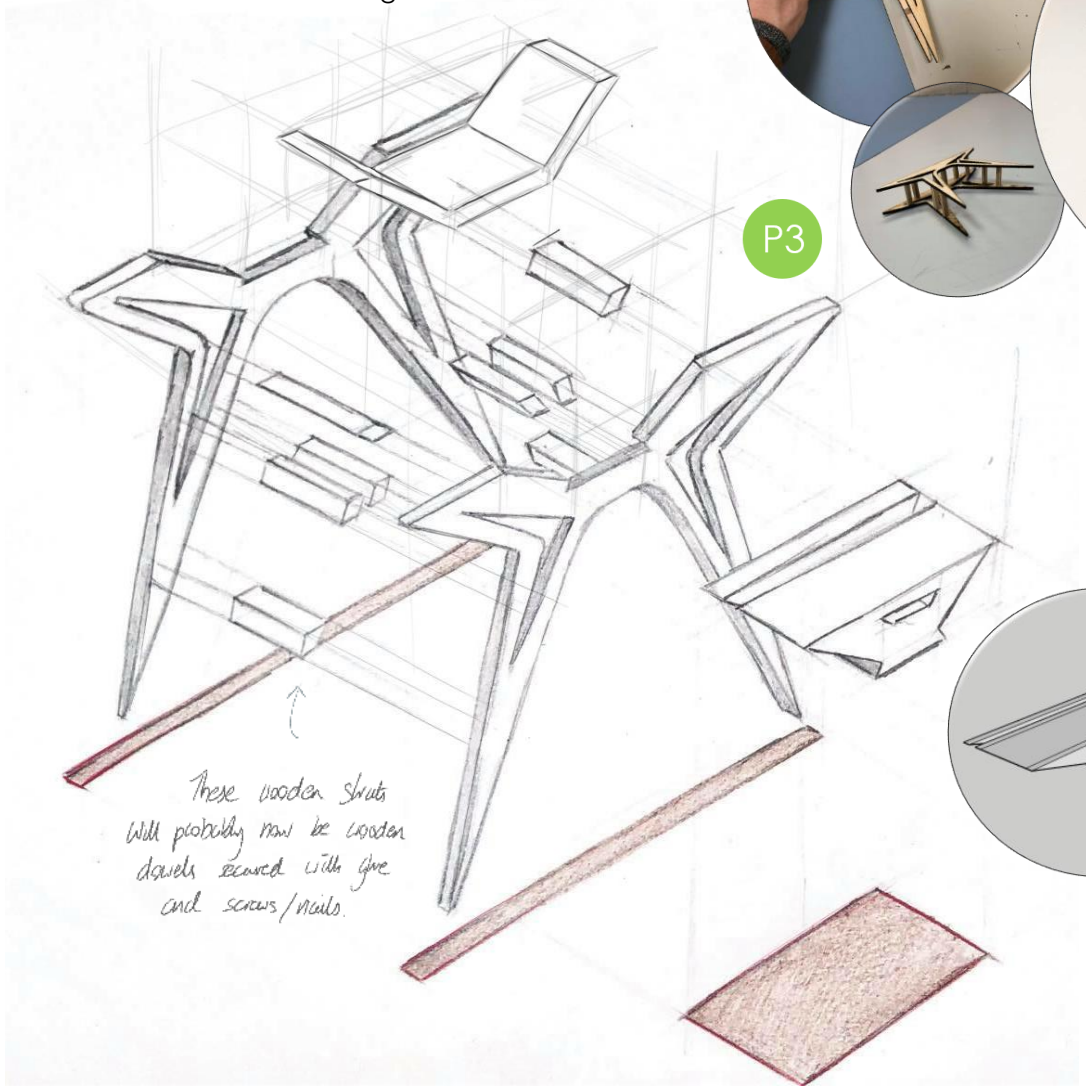
P1

DESIGN #2



FINAL PRODUCT DEVELOPMENT

After finalising my last design, I needed to expand on how to manufacture it. Below is a sketch showing an exploded isometric diagram of my product. The sketch is including everything other than the cladding and the surface top. However, after further deliberation I decided not to clad the legs.



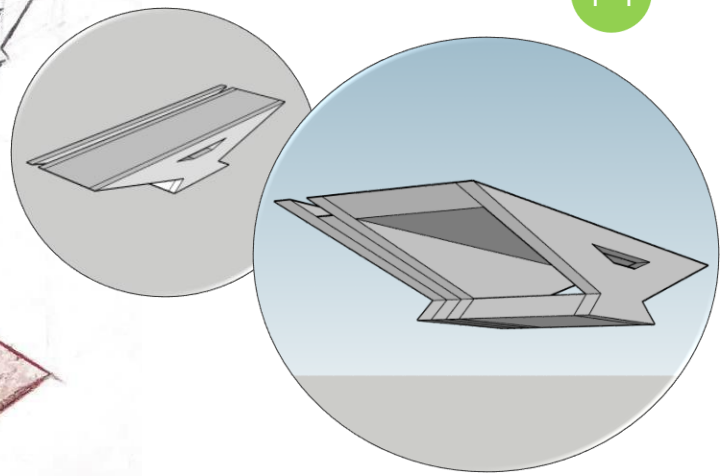
MM

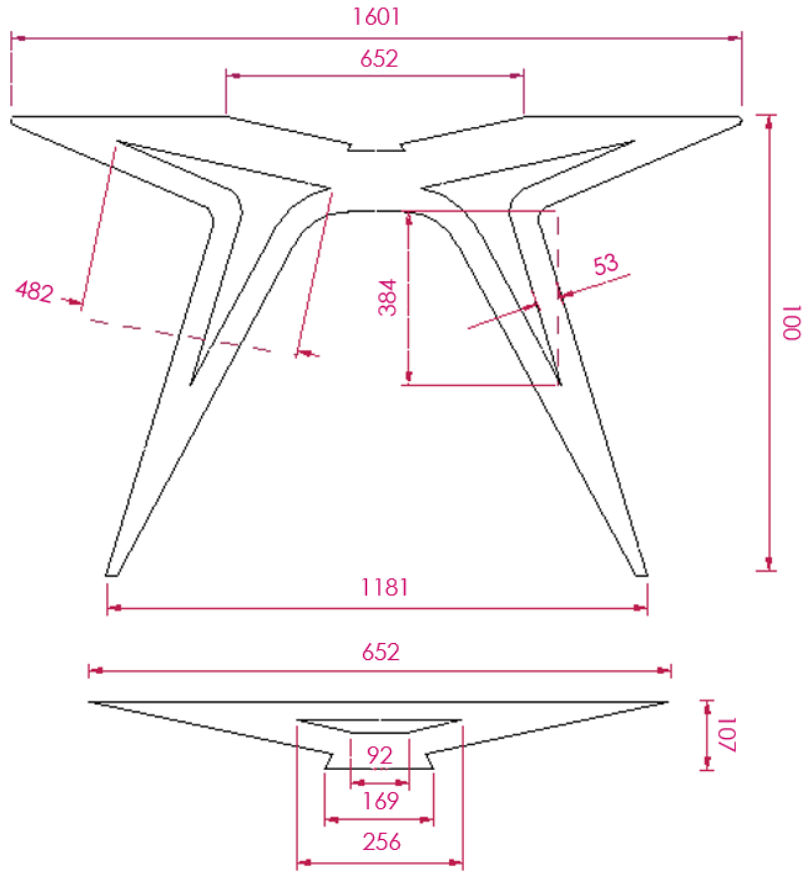
P1

P3

To create the draw that will encapsulate the storage compartment, It will be made up of multiple layers and a rod connecting them, so there will be extra space to hang keys. It'll also reduce weight of the draw

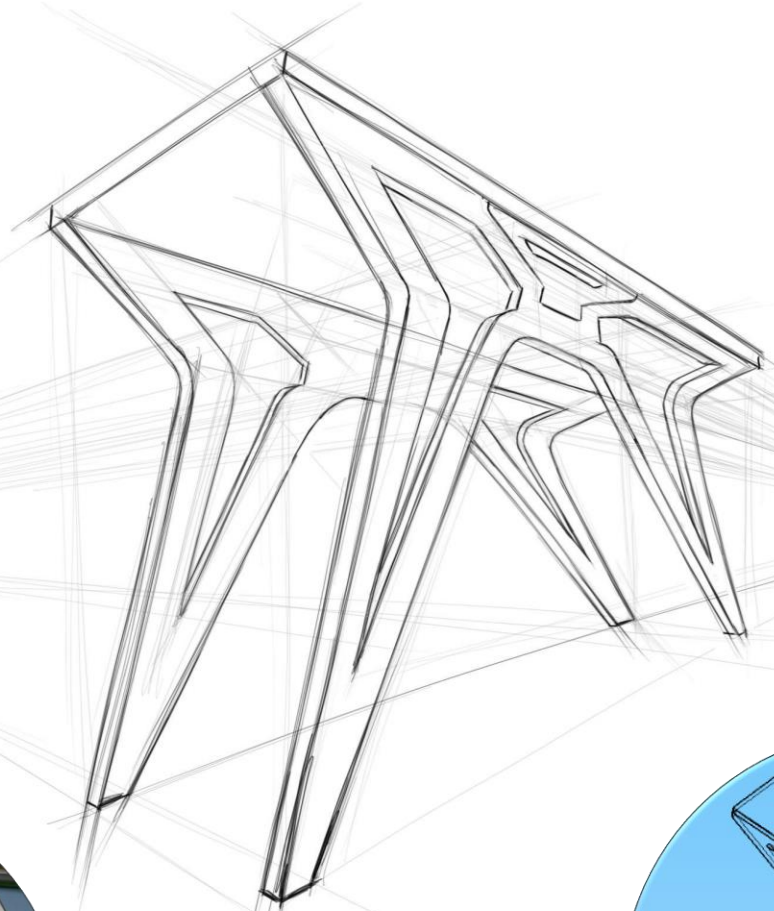
P4

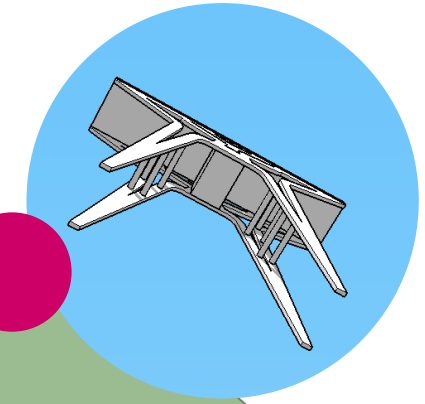


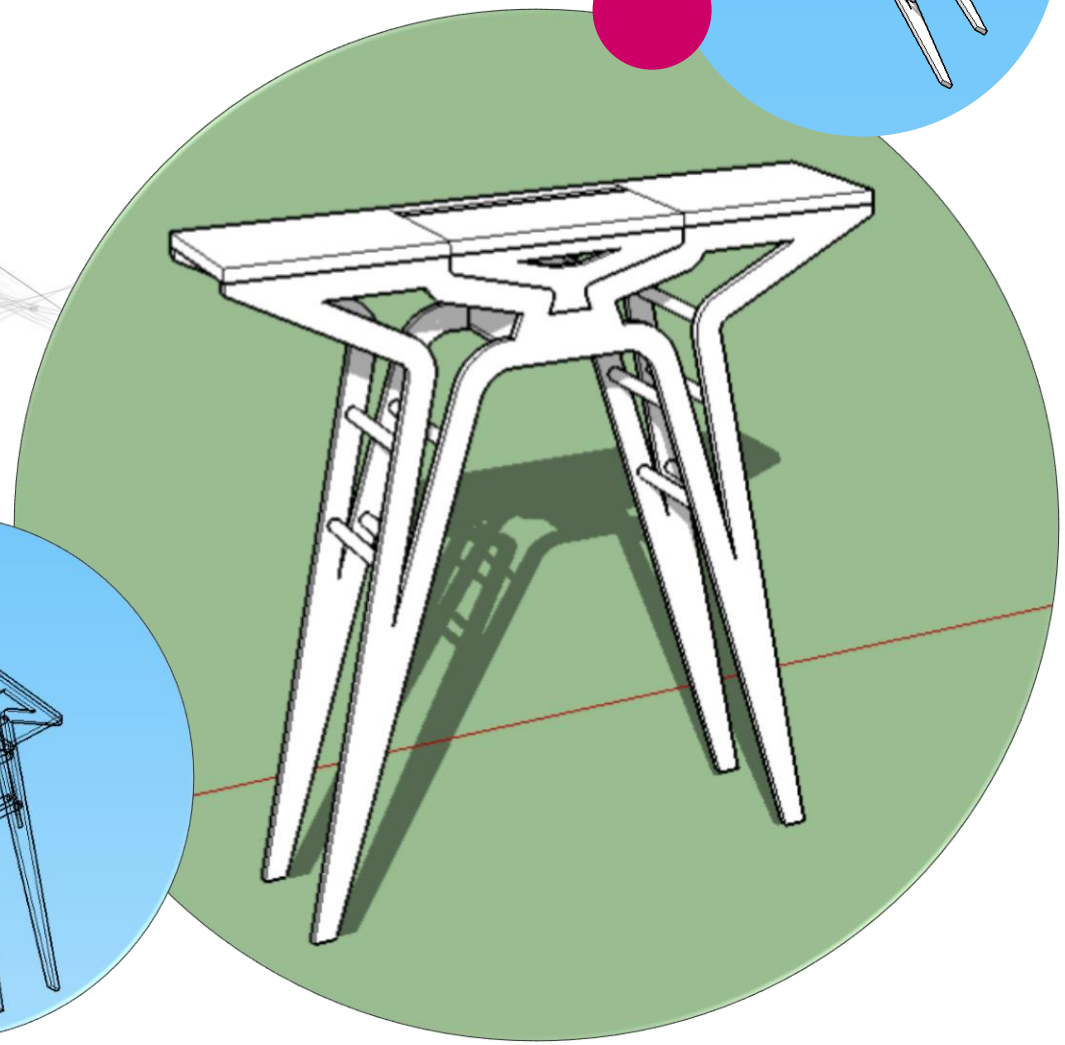


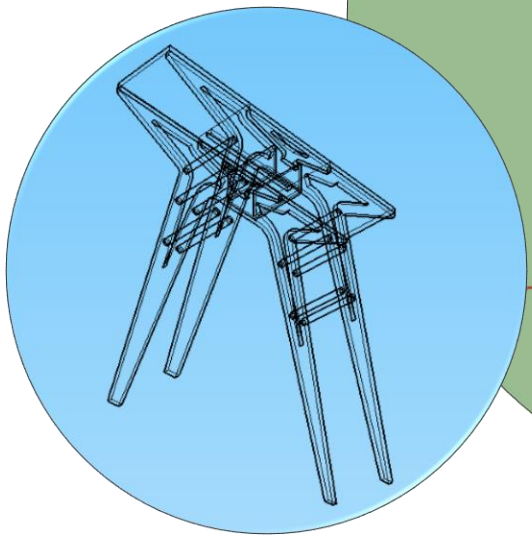
Item	Material	Source
Front & back cut-out	18 mm MDF	Out sourced
Dowels	25 mm Wood	Out sourced
Tools		On site
Surface top	18 mm MDF	Out sourced
Cladding	18 mm MDF	Out sourced

FINAL DESIGN SOLUTION









FINAL PRODUCT TECHNICAL SPECIFICATION

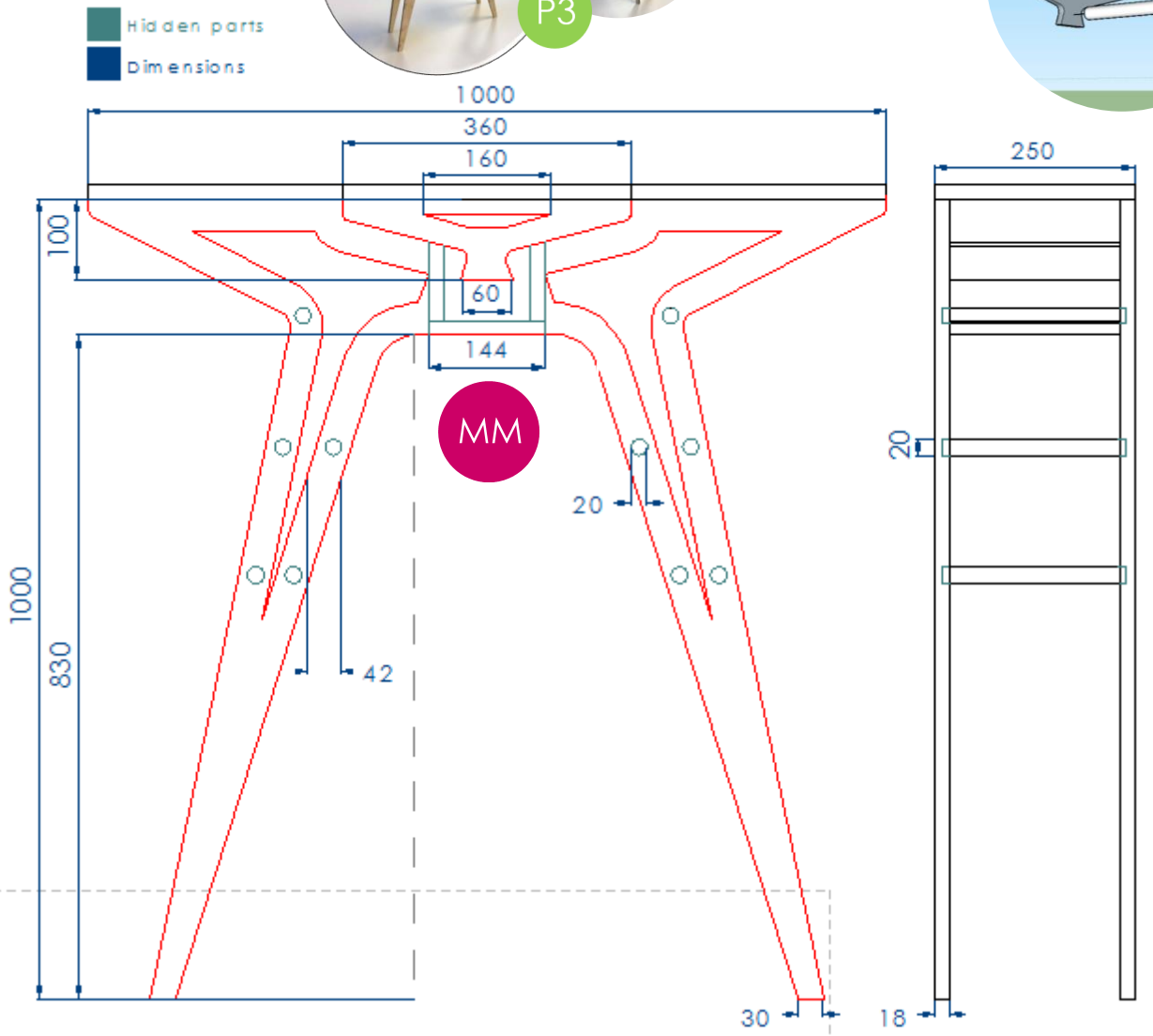
This is the final design with the proper dimensions (in Millimetres). The last design had some inconvenient sizes that were too large in some places. For example, the width of the last design was too long, measured at 1600mm. That size is not practical, especially for the intended use.

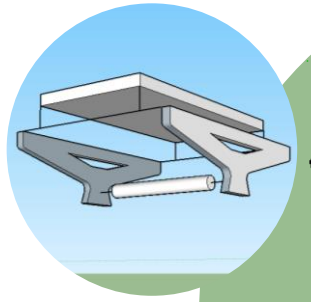
P1

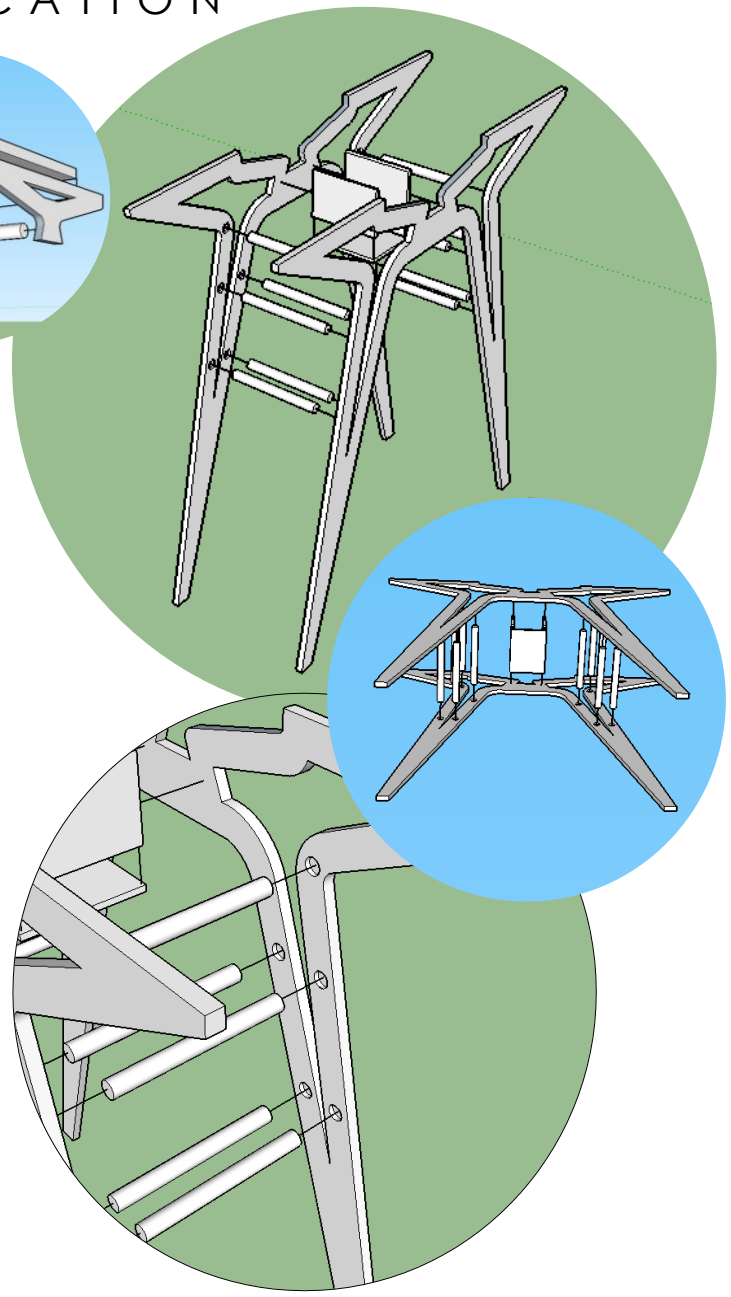
Other than changing the dimensions, I also had to alter the shape of the drawer. The drawer needs to be convenient to hold and pull out. In addition, the outline within the main table stand changed to suit the new drawer.

The red lines indicate what the outline of the main shape will be what the machine will read and cut. The green lines show where hidden components will be, such as: dowels, supports, and storage compartment.

P3





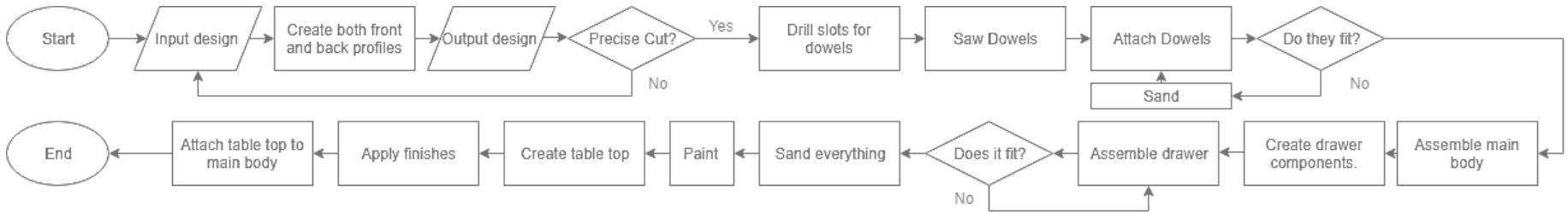


Materials

- The dowels will be 20mm thick (diameter) and 230mm long .
- All MDF will be used in 18mm thickness.
- Joining components with strong wood combining adhesive – a few with screws as well.
- Paint
- Filler

PROTOTYPE PLANNING

Task	Materials	Size	Quantity	Tools/process	Safety/Risk	Quality Control
Profiles for main body.	18mm MDF	sheet of 1000x1000mm	2 sheets	CAD/CAM – CNC Routing	While machinery is in production, stay back and ensure well ventilation	Ensure the design is correct in dimensions and structure.
Dowel Slots/openings	18mm MDF (profiles)	25mm Diameter, 10mm deep	8 holes	Pillar drill with a 25mm flat drill bit.	When in use, wear safety goggles and an apron – keep hands clear from the drill bit	After each drill, measure the depth to ensure consistency between all holes.
Dowels	25mm diameter	Length of 234mm	8 Dowels	Manual measurements and sawing	Ensure an apron is worn and the dowel is secure and tight in vice.	After each cut, ensure the lengths are the same, if not recut another piece.
Drawer	6mm MDF	H:100 x W:360 D:250 mm	1 drawer – made from 4 pieces .	Laser cutter, PVA Glue, Clamps.	Keep the lid closed while the laser cutter is in use. Wipe excess glue off and wash hands.	While applying pressure which each clamp, ensure the components are correctly aligned.
Assemble Main body	N/A	H:1000 x W:1000 x D:250 mm	N/A	PVA Glue, Sash Clamps.	Cautious when moving Sash Clamps. Wipe off excess glue and wash hands.	While applying pressure which each clamp, ensure the components are correctly aligned.
Table top	18mm Pine	1000x250mm	1	Saw	Wear safety googles and an apron, also ensure you are in a well ventilated room.	While drawing guidelines, ensure they are correct and at right angles (perhaps a set square).
Sanding	80 grit sand paper	N/A	N/A	Sand the entire surface and the edges.	Sand in a well ventilated room. Wear safety goggles with an apron.	After every bit of sanding, feel the surface to ensure it is smooth enough.
Painting	Paint	N/A	N/A	Apply an undercoat and then a couple top coats	Well ventilated room with news paper underneath product, wear an apron.	Ensure smooth thin coats to avoiding uneven surface.
Finishing process	Wood stain, Varnish, Wax	N/A	N/A	Apply a thin coat of stain, then 8 coats for varnish and a wax finish.	Wear gloves to avoid contact with skin.	Make sure the coats are applied evenly to avoid discolouration.
Assemble	N/A	H:1000 x W:1000 x D:250 mm	N/A	Screw table top onto main body with power drill.	Keep hands clear from drill and wear safety goggles.	Create arcuate guidelines to ensure precise drilling.



1. Send CAD file to CNC routing stakeholders
2. Once received, create guidelines and drill 25mm holes into both profiles with a 10 mm depth.
3. Cut out the dowels with the width of the product and sand down the ends to ensure a correct fit. Test the dowels fit before glueing
4. Use PVA glue to attach both profiles with the dowels
5. Create the drawer component by cutting out the front back and sides
6. Sand the bodies then paint undercoat, sand again then use final paint.
7. Cut out wooden top and attatch to the main body
8. Apply final finishes like stain, varnish, and wax.

MANUFACTURING

Stakeholder

From: Cameron Lester-John <CameronLJ@hotmail.co.uk>
Sent: 17 January 2019 15:18
To: Richard Cottrell <richard@cgjoinery.co.uk>
Subject: Routing

Hello,
I am a student from Wallingford school Sixth form and I was recently in contact with your colleague, Cindie. She gave me your email to contact you about my inquiries. Also, there may be some others from my class that will be in contact.

I was wondering if it would be possible to send you a CAD/CAM design and cut it out on your Routing machine - no need to assemble. I would pick it up when it is available. Furthermore, how do you estimate the the cost? For example, is it base on £/minute/hour etc...

If it is possible to do so, can you inform me of the maximum dimensions of which you can cut out and the format your machine reads to cut out. Also, would you be able to do it with 18mm thick MDF?

Thank you,
-Cameron

From: Chris <Chris@cgjoinery.co.uk>
Sent: 18 January 2019 12:53
To: CameronLJ@hotmail.co.uk
Subject: Re: Routing

Hello,

Please send me the drawings and short description of what would you like to do, and I will be able to quote the job based on this.

We can machine most wood related materials eg MDF, Ply, Chipboard, Wood etc...
I hope this is helpful.

Best Regards

From: Cameron Lester-John <cameronlj@hotmail.co.uk>
Sent: 21 January 2019 14:14:39
To: Chris
Subject: Re: Routing

Hi,

I have provided a drawing of the shapes and a CAD file (if you can do anything with that). There is also another image attached that provides the dimensions (mm). I would like those shapes cut out (so two of the same shape) where the red lines are. Also, I would like it in 18mm thick MDF.

Thank you, Cameron

Chris <Chris@cgjoinery.co.uk>
Tue 22/01/2019 13:59
Cameron Lester-John

Cameron's drawing.dwg
83 KB

Hi Cameron,

Please clarify if both copies on the drawing are the same and how many of them do you need.
Also please find attached drawing with approx. finish look.
All the internal corner will have a radius of 4 mm or greater it is due to the diameter of the cutter we will use which is 8mm.
Can you also clarify what is going on with the top center part of the drawing?

If you need only 2 copies of this profile it will be £75 +vat.

Best regards

Chris

chris@cgjoinery.co.uk
C & G Joinery Limited
13 W & G Estate

Above is the conversation I had with a stakeholder that provided the CNC Routing I needed to create both profiles for my end product prototype. The total price came to £90 (£15 VAT). The service was adequate, however, the replies did tend to take awhile (I had to call once to speed things up).

C&G JOINERY est. 1973

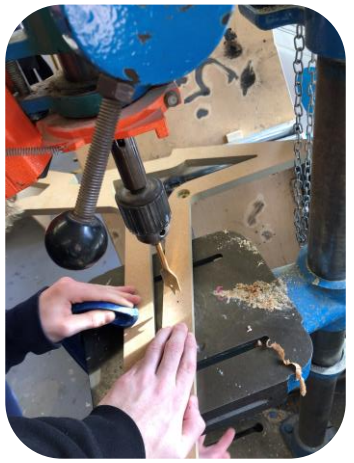
Making...

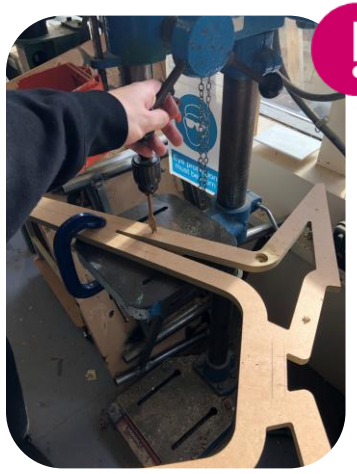
Risk Assessment

First, I aligned the two profiles and accurately drew on guidelines where the dowels will connect them. Keeping the profiles aligned, I drilled very thin holes in the dowel markings to ensure the position is exactly the same on both shapes.

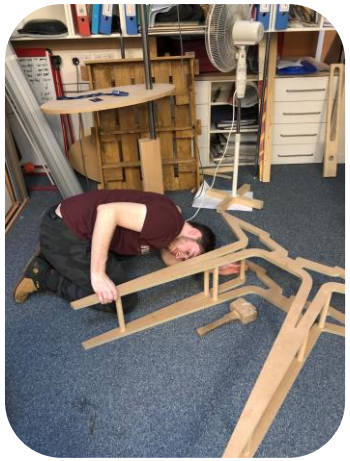
Next, I drilled 10mm deep holes with a 25mm flat drill bit in the markings for the dowels. Afterwards, I gathered some 25mm thick dowels and cut out eight 234mm lengths.

When using the pillar drill, wear goggles and ensure wood is secured





MANUFACTURING



Following that, I inserted the dowels without the glue to ensure they fit. They did but it was a bit too tight. However, after placing it upright, one could see that it was successfully levelled

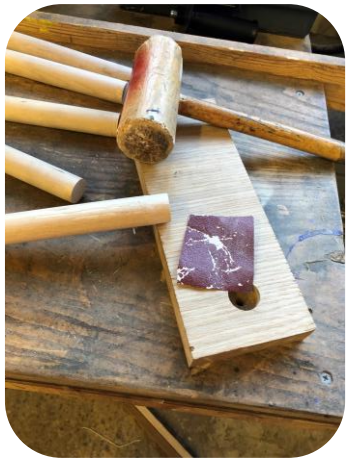
To ensure a smoother fit, I sanded down all the edges on the dowels and started to assemble the main structure by using PVA glue

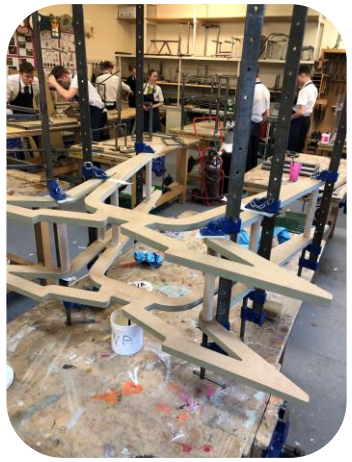
Unfortunately, while taking the structure apart, one of the legs snapped. This problem could jeopardise the product's strength and durability.

PROBLEM 1

To overcome this issue, I applied some PVA glue in the cracks and snapped wood. Afterwards, I clamped both sides together to regain shape.

Finally, I clamped the whole structure together by using sash clamps. Then I wiped away any excess glue.





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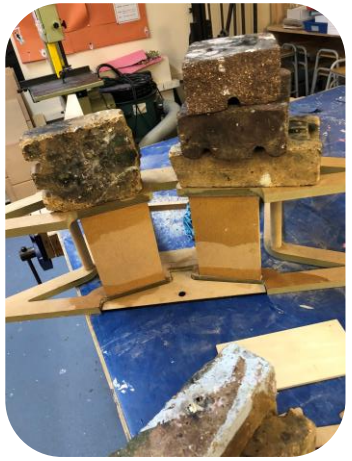


After the structure was successfully assembled, I started the create the drawer for the storage aspect of the product. I took initial measurements and required information.

Subsequently, I glued the walls to the profiles of the drawer along will two bigger supports

Ensure the filler doesn't touch skin and use a well ventilated room

When sawing, ensure you are wearing goggles and the wood is secured tight. Watch your hands.

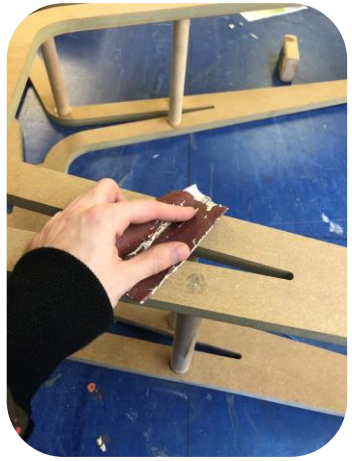
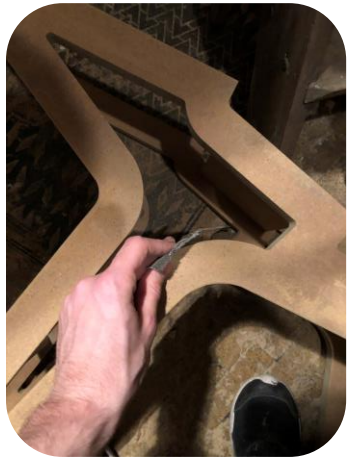
I cut out multiple sides to act as the walls for the drawer and the supports it will sit on which will guide it into the opening. I used the laser cutter to accurately produce both profiles of the drawer.

Following that, I revisited the main body of the product and covered any blemishes with some filler. Afterwards, I smoothed the surface by sanding it (also curving off the edges).

I attached the supports/brackets of wood by using PVA glue and the pressure from the heavy bricks on top.

Sanding the edges allowed a smoother paint finish that minimised the amount of paint that built up in certain areas. The first couple coats were a light water based under coat – to prep the top coat.



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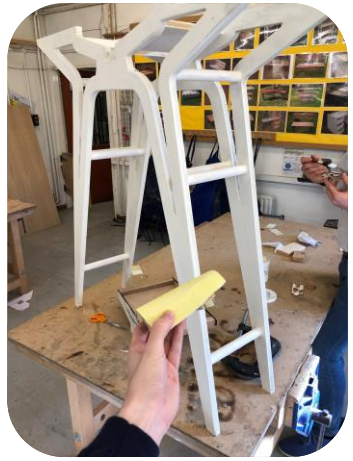
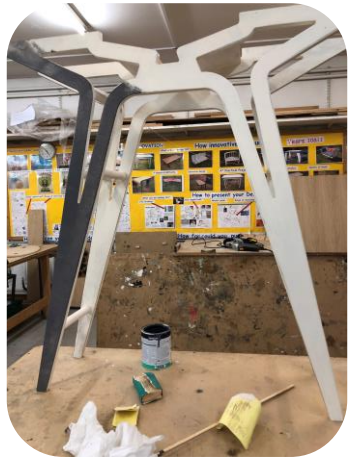
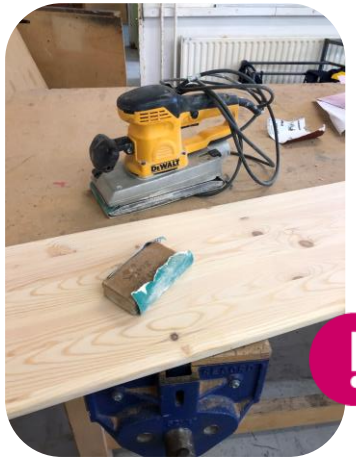
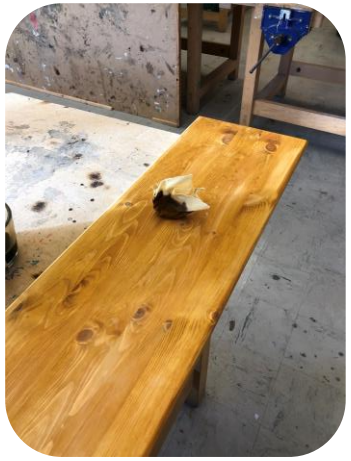








Here, I started lightly sanding down the surface of the undercoat with a 240 grit sand paper. I also continued to round the edges and the ends of the dowels (where it meets the body).

Shortly after, I then started to apply varnish. This would protect the stain and create a more glossy finish (will also protect the wood from liquids. All together I used 8 coats.

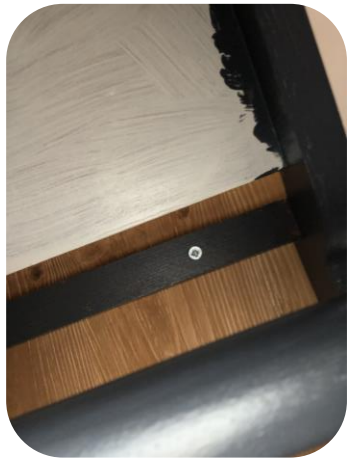
Following that, I then applied my top coat (Urban Sky). I had to apply a few layers to completed cover the white/cream undercoat.

After the varnish, I then finished the wood with a final coat/layer of wax which was applied with a wire brush and buffed with a piece of cloth.

When using the sander, ensure you are wearing goggles due to saw dust. Also wear gloves when staining

Between coats, I started to create my wooden surface on top. The wood I used was pine and I ensured there was a 10mm overhang from the body. After sanding the edges, I began to stain it. I applied a couple coats of stain to receive a deeper finish

Subsequently, I added two more struts for support and a guide for the drawer (slide in smoothly). This was a attached with epoxy resin. The wooden top is attached with 4 screws going through these two supports.



FEASIBILITY OF FINAL PROTOTYPE

Here is the final prototype a couple minutes after it's completion, when the table top was attached.

After an initial look, I can say that I am happy with the final product. Although the design was altered from it's initial design, one can say it satisfies its general purpose.

It's thin and open body provides available storage for unproductible items - under and around the product

For the final part of my project, I am now researching into possible future outcomes and critical reflection. These Images showcase the outcome of my prototype manufacturing. The main focus in this piece of analysis is it determined if it is fit for purpose The larger image is a typical scene that sets my product in its ideal setting.

For the product to suit what it was built for, it needs to be able to be used for various stuff which the average household needs (if not more). The image on the right shows one of the first uses. The table is holding multiple objects as any table could. One of its main capabilities is to act as a centre piece (while holding various decorations.

Surprisingly there was an unexpected use that was discovered throughout the construction. The dowels were initially used to minimise material cost and let the product appear thin and less bulky. However, one realised the thought: Why can't I put stuff on there? So that's exactly what I did and it worked perfectly.

One other main component that was planned was the storage compartment for smaller/more valuable items (e.g. phones, tablets, keys, wallets, etc…). This photo proves that my product can hold these items with ease.

Throughout the manufacturing of the final prototype, one can say that some parts didn't go to plan and the design had to be altered from what it initially was. However, most of the changes occurred to ensue the best outcome.

To conclude the initial showcase, one can say that I achieved most of the main requirements that is needed to be classed as a normal (successful) table.

REFLECTION AND FEEDBACK

To get a better grasp and understanding of how well my product has truly performed, I have to critically reflect its strengths and weaknesses. This will help my pin point where I need to focus my analysis and determined the best outcome if I were to do it again.

Strengths	Weaknesses
Can withhold most items that is placed on top while containing its structural integrity.	The drawer is limited to only a few items at a time.
It successfully reflects a modern lifestyle that most households can acquire.	Some segments are not complete and/or decorated.
The table top finish helps the product protect the wood from liquids.	The shape of the drawer limits what kind of objects it can hold.
The thin/open body allows other larger objects be placed under/around it.	The drawer can sometimes be rough when opening.
The structure is arcuately assembled and projects a clear/precise level on top.	
The narrow width allows the product to be placed in most rooms.	
Lightweight and can easily be transported.	

From an simple analysis such as recording strengths and weakness, one can already see that most of the weakness focus on a certain segment – the drawer. There are a couple reasons as to why this is. Firstly, due to the product needing a more modern aesthetic, I compromised the shape and left the drawer with an awkward form. I underestimated how small the storage compartment would be. Secondly, the supports which the drawer is held on by isn't as refined as hoped. This means there are some areas that are more rough than expected, this gives the drawer a little resistance when pulled – this can jeopardise one of the main points of which the product was designed on.

However, while it might fail in some features, it also succeeds in other areas as defined above. Overall, it fits its purpose visually and structurally – it offers a refined aesthetic and a quality finish.

First glance

"I think the final model appears quite unique and interesting. I enjoy the style and how well the two finishes compliment each other. The combination in styles reflects a modern theme. At first glance it looks in good shape and pretty successful."

Client Survey

"It looks very new and fresh. I haven't seen much like it. The figure is quite quirky and distinctive. The structure also appears safe and able. I especially like the wooden top, it gives the furniture a valuable quality."

After getting the clients initial thoughts, I decided to get a better understanding of how successful my product actually is. To do this I got them to answer an array of relevant questions.

Is the final outcome what you expected?

- Overall finish, yes it is what I expected. There are a couple features that are new from previous designs.
- Somewhat, yes. I was expecting a type of mechanism on top that helped organise my devices more.

Are you able to fit most of your valuables in the storage feature?

- Not all of my valuables, the storage compartment isn't big enough. But it can hold/hide my essential items, like keys and phone.
- Yes, I do not use much but my phone, keys and wallet. Also, I only need them when I go out so its convenient for me.

Where would you put this product in your house?

- Personally, I would have this product in my room. It looks like it could be a good piece for my appliances and accessories.
- Preferably in the hallway just before the front door. It's narrow enough and can hold my small items it need before going out.

Would you prefer to have this product bought flat packed or assembled?

- I would most likely prefer if it was flat packed, it makes it easier to put in the car and through the front door.
- I would like it already assembled and delivered to my door. If it were flat packed, I'd have to ask someone to help me.

CRITICAL ANALYSIS

Summarised issues/problems

After the third party feedback, I manage to summarise the main issues which they identified throughout the questioning. Firstly, table cannot charge their portable devices. Secondly, the drawer is too small (awkward shape). Thirdly, it isn't flat packed – the product will be bought already assembled.

Third party requirements

- To be able to hold their devices and other essentials (like wallet, keys, etc…)
- To have the option to place in most rooms (Size)
- Be strong enough to hold most items (like books, decorations, etc…)
- Have a modern aesthetic.
- Have a component/mechanism that helps charge devices.
- Include a sort of hidden storage feature.
- Preferably lightweight, easy to transport.

These points above were recorded before I started to design my product. They were determined by the initial contact I had with my main third party clients. In this critical analysis stage, I will use these points to determined my next steps.

Requirement	Outcome
Is the product able to hold their devices?	
Can the product fit in most rooms?	
Is the item strong enough to hold/contain most items in an average household?	
Does the aesthetic relay a modern theme that appeals to most homes?	
Does the product have a feature that allows to charge numerous devices?	
Is there a successful hidden feature?	
Is it lightweight and easy to carry?	

The majority of the points were met (57%) thus making it somewhat adequate for use. However, to be fully successful all the points should be made. In the end, the client will choose the product that satisfies most of their needs. Now I have to take the points that failed and suggest modifications that can boost the quality of the final outcome of my product.

Existing products comparison.

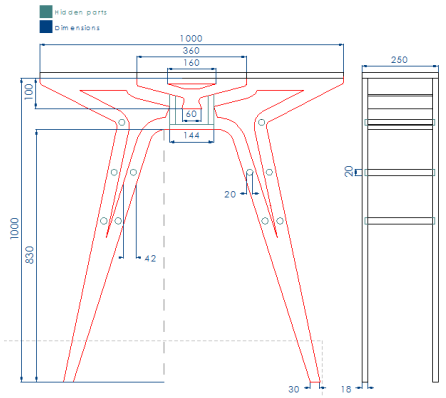
Next, I decided to compare the functionality of my product to existing products. Doing this will help determined if my product would have a chance be able to compete with products already sold and used. Firstly, the image to the left shows a common console table. I chose this one because I noticed it had a quite large drawer space, as well as having three of them. This product ultimately beats me in the aspect of storage space (which would fit my first client with many devices).

Subsequently, I also spotted this table that is different and focuses more on aesthetics and less function. This is clear due to the unused space beneath it. Similar to the first one, it also lacks a bottom rack/shelf that is capable of holding something that could get dirty – like shoes/bags/etc… This is where my product succeeds in others alternative storage capabilities.

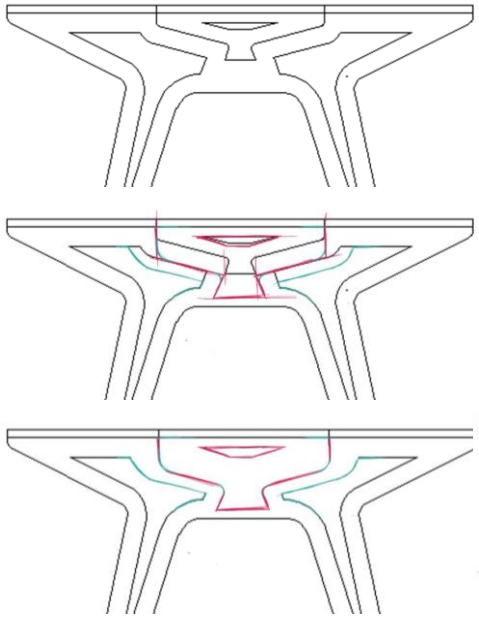
On the right is a product that supports multiple devices while offering charging ports. I discovered this because in the manufacturing I didn't include my intended charging function – this was due to some complications with the table's structure and stability. Meaning my charging feature was poorly designed. This image provides useful inspiration for a possible feature.

Next steps....

For the final part of my analysis, it is time to consider what to do afterwards. I have gathered the understanding of the issues that surround my product and now what is left is to decide what to do with this information. Furthermore, I will now begin to try and develop my existing prototype and see if fixing these issues will promote my product even further and have a better overall quality/appeal.
First things first is to revisit the design of the drawer and correct the changes that had to be made while in the manufacturing stage. Next, I would have to see if I could create a possible design solution for the charging feature that could possibly act as a separate component that attaches to the top on the existing prototype.

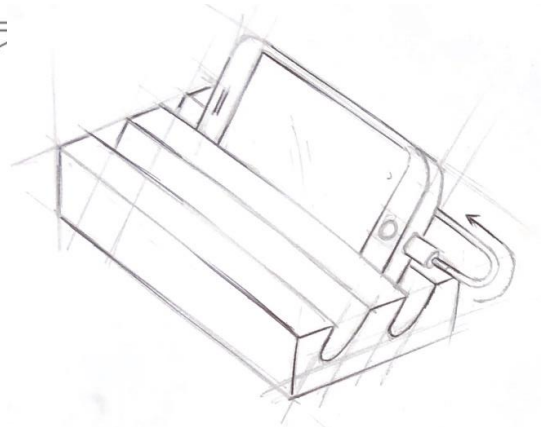


POSSIBLE MODIFICATION AND MARKETING

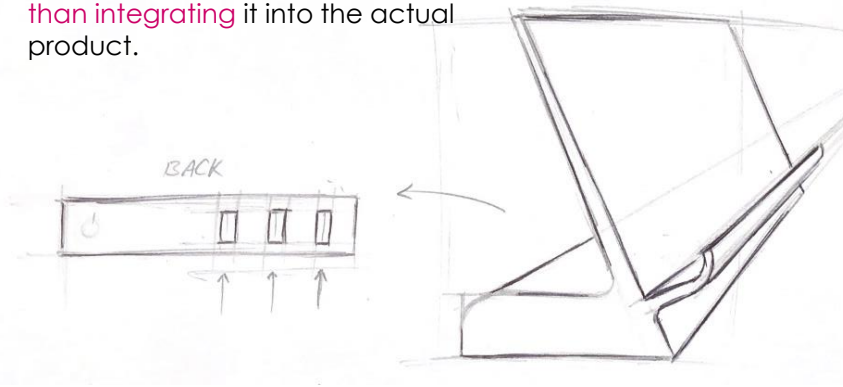


Modifications

Here, I took the original outline and started to contemplate what possible changes I could make to increase the drawer size while keeping the general outline from before. So, I took the bottom and stretched it further down. This change would increase the height by 40mm. However, because of this, I had to change the contour along with it so the pattern would match.



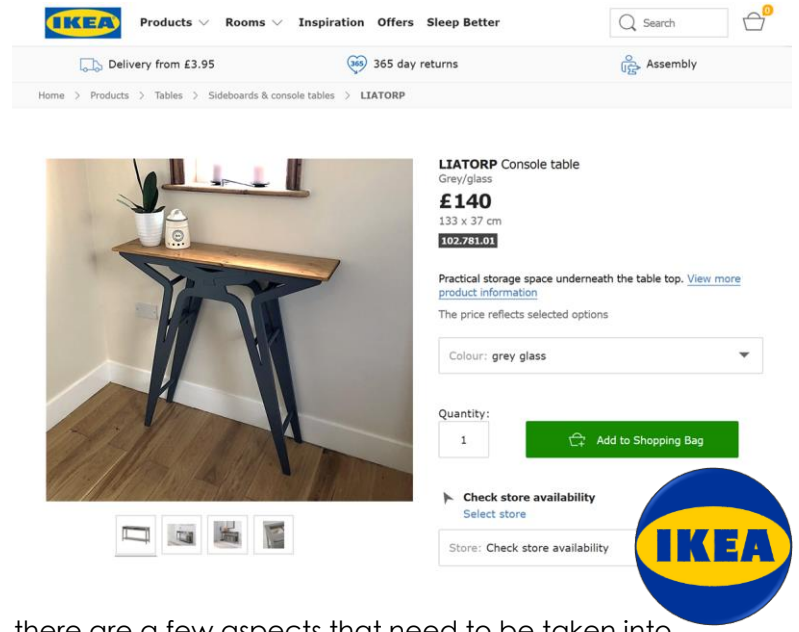
For this part, I took some influence from those two products on the previous slide and had a go at designing a couple of my own. While doing so, I discovered it would have been a lot more efficient if I would to create this separate rather than integrating it into the actual product.



Both designs have considered the integrated charging feature – the ports would be facing behind to ensure the wires are hidden

Marketing

Marketing plays as a key role to consider when designing and evaluating a product. For example, one needs to know what target market they are aiming for and what platform will be the best to determined the most amount of sales. Due to this only being a one of product, creating my own platform/website would be unnecessary and a waste of time. So, the best output for me would be to sell my design to a larger organisation and claim my equity. An obvious example would be IKEA. On the right is an example page with my product.



Pricing

When it comes to determining the price, there are a few aspects that need to be taken into account. Firstly, the sourcing of materials. The two main profiles cost £90, the dowels were £18 (approx.), and the rest of the wood was £15. The total price for materials would be £123 (approx.) Secondly, the time and labour it took to assemble. Given that the manufacturing took about 5-6 hours, I would charge an extra £60. The tools were already on hand so that wouldn't effect the overall cost. However, if the product was produced through industry there would be a lot of extra machines/mechanisms that would charge more to obtain/use. On the other hand, it would replace the labours hours and perhaps result in an overall lower cost. Finally, I were to sell it as a one off the total price would be £183.

If I were to go independent, I would need a logo so people can recognise my brand/products. My logo would have to reflect what my business sells, and at the moment my theme is focused on modernism and minimalism. The image on the right is my result and one can see that I kept the lines simple and used a maximum of three colours. The inspiration for the shape came from my table as well.