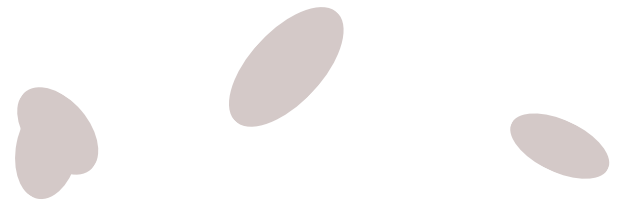


Haru Collection



Haru

Noun. Spring



Thank you to my advisors Kirsten White and Andrew Reesor
For your support and guidance

Thank you to the Craft and Design Studio Tech Christina Pupo

Thank you to all my classmates for
all of their support though out the years

Special Thanks to Scott Laughton

Jared Baylon

Sheridan College

Faculty of Animation, Arts and Design

Final Year Capstone Project submitted to the School of Animation, Arts and Design, Sheridan
College in partial fulfillment requirement for a Bachelor of Craft and Design in Furniture

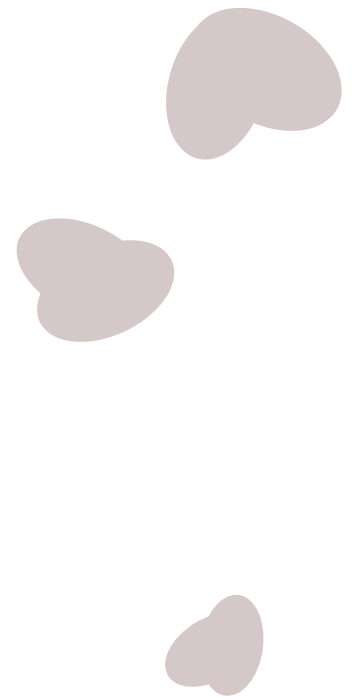




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Introduction



Figure 1 - Jared Baylon





I am intrigued by contemporary designs, and I want to combine them with traditional Japanese woodworking joinery. I was first introduced to woodworking in high school, and that led me to explore different types of woodworking. In my research, I learned that Japan has a rich history of woodworking, they developed their own technique called Sashimono. This technique is assembling furniture or any other wooden structures without the use of nails or glue, only relying upon the complex design of the joint creating a friction-fit connection. My interest in Japanese woodworking really kicked off at Sheridan College when I discovered Japanese designers such as Naoto Fukasawa and George Nakashima, and seeing how they approach their work.

The next section delves into the three Japanese woodworking techniques, their history, and how I am planning on incorporating them into my collections. The research will also go into Japanese designers, how their principles influence my designs, and what pieces I drew inspiration from.

Japanese Designers



Naoto Fukasawa

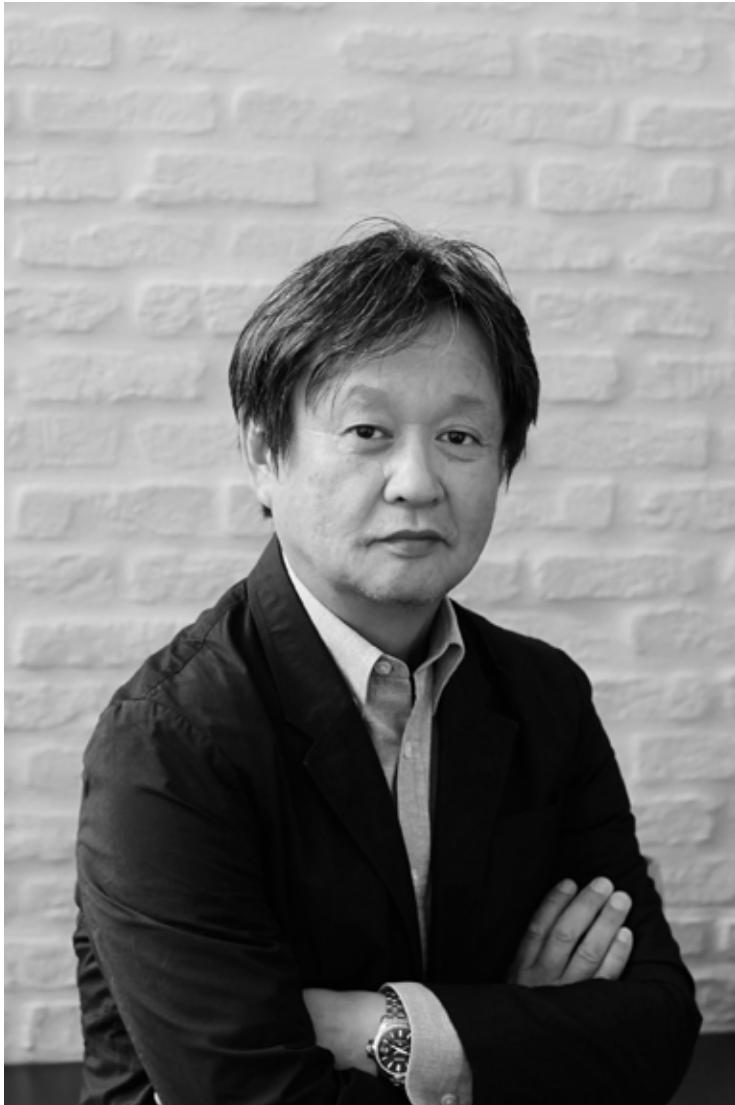


Figure 2 - Naoto Fukasawa

Naoto Fukasawa was born in Japan, Yamanashi Prefecture in 1956. Tama Art University Product design the department is the school Fukasawa studied, then graduated from in 1980. In the same year. He joined Seiko Epson, where he was the head of advanced development of the design. In 1989, Fukasawa moved to the States where he joined the ID Two. For many years, Fukasawa has been honing his craftsmanship skills, mostly focusing on Silicon Valley industries in 1996.

Fukasawa decided to return to Japan, and this is where he started the IDEO Tokyo office, creating the Japanese design consultant base for his company. In 2003, Fukasawa went independent and created his own company named NAOTO FUKASAWA DESIGN. Right now, Fukasawa designs a wide range of brands around the world, as well as designs for many local Japanese companies. Naoto's designs are well recognized, he imbues his designs with a quiet power that expression people's hopes and expectations. Fukasawa incorporates his philosophies into his designs, terms such as design dissolving in behavior, the center of consciousness, normality, outline, and archetype. Fukasawa still continues to incorporate these philosophies into his craftsmanship.





Figure 3 - Naoto Fukasawa





Figure 4 - Hiroshima Lounge Chair by Naoto Fukasawa



Figure 5 - Hiroshima Lounge Chair by Naoto Fukasawa

The Hiroshima collection by Naoto Fukasawa is a chair and table with simple forms and structures that express solid wood. The curve on the back which connects to the armrest is an engaging form. This gives the seat a roomy feel to the chair and this piece comes in a dining or lounge chair. This piece is a great example of how each component interacts with each other, how are they connected and what form does that take shape?

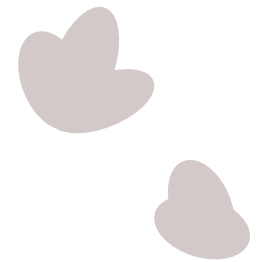




Figure 6 - Hiroshima Table by Naoto Fukasawa

Just like the Hiroshima chair, the dining table features a simple form with a delicate structure that highlights the solid wood. The natural color of the wood gives this piece a warm comfort feel, which plays with the contrast of the lights and shadows given by the simple form of the piece. This piece shows the relationship of the positive and negative space with the form of the dining table.

George Nakashima

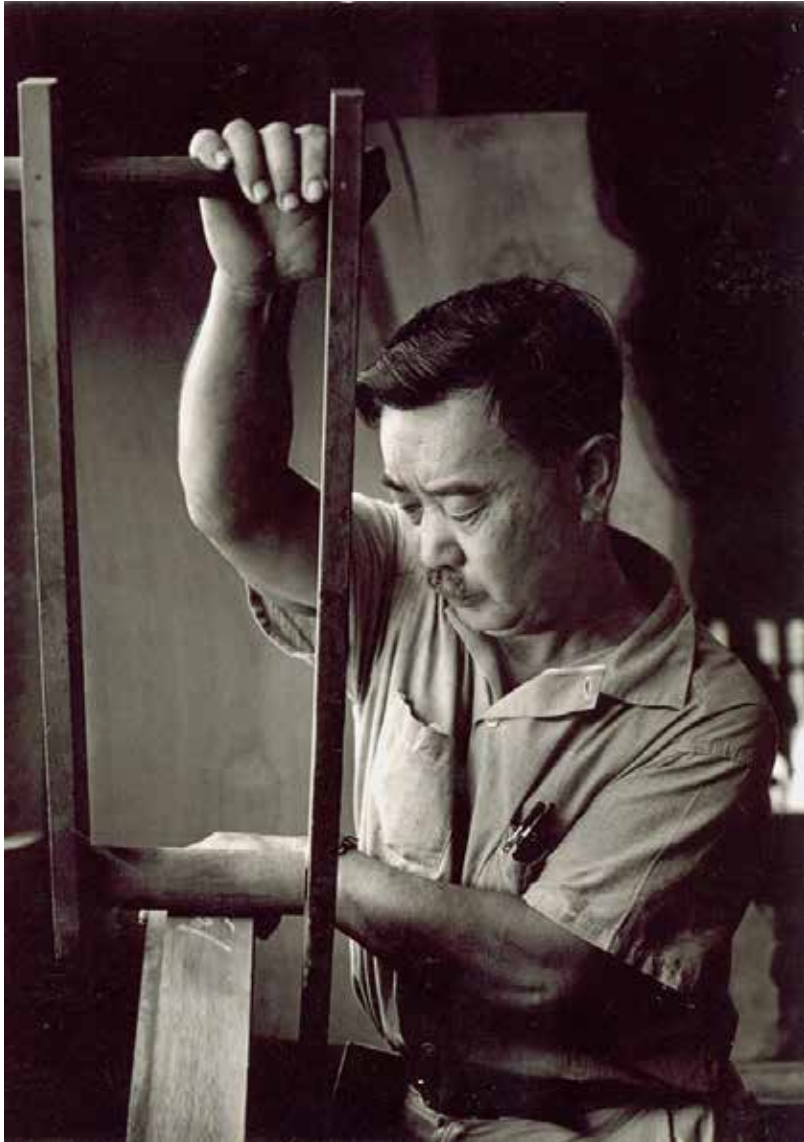


Figure 7 - George Nakashima

George Nakashima started his career in furniture as a reactionary movement towards modern architects, design, and arts during the 20th century. In his works, he calls for a reclamation of the philosophy of early historical periods, in which the eye and hand determined the individual's world in relation to the universe, instead of the universe itself. George had a background in architectural history and design, as well as in engineering and constructing building experience. Later George changed to a simpler life that involves direct contact with materials, tools, and clients. George believed that craftsmanship is more important than the egoism of the modern design world.

He believed in the inner beauty of the materials like wood, and that knowledge and respect for the material are important. The piece created with the material should keep its marks of individuality and the skills of the craftsmen who brought out it into being.



Figure 8 - George Nakashima



Figure 9 - Odakyu Cabinet by George Nakashima



Figure 10 - Odakyu Cabinet by George Nakashima



Figure 11 - Double Sliding Door Cabinet by George Nakashima

The Double sliding door cabinet is designed with an optional free-edge front with dovetail corners. The main material used in this cabinet is walnut. The doors of the cabinet can be made with solid wood walnut or wooden grilles with a handwoven Pandanus cloth. This piece has one section with drawers, and the other section has adjustable shelves. The other variant, the Three sliding door cabinets are similar with three sections with drawers in the center and adjustable shelves on the ends of the cabinet.



Figure 12 - Double Sliding Door Cabinet by George Nakashima

Japanese Techniques

Sashimono

Sashimono is a technique of assembling wood together Without the use of nails or Glue. creating simple or complex joints.

Moku-zogan

Moku-zogan is hand-cutting different pieces of wood into decorative shapes for inlay into a groove or a void on the wooden surface.

Shoji

Shoji is a door, window, or divider used in traditional Japanese structures. It is a translucent rice paper on a wooden latticework frame.

Sashimono



Figure 13 - Kanawa Tsugi joint by Dylan Iwakuni

Japanese craftsmen believed in nature and the materials they were using, believing that there is no need for nails if you created an effective joint. It requires skills to precisely carve out those joints, if carved too much, the joint will be loose and fall apart. This joint is commonly found in towers and frames and beams.

The Kanawa Tsugi is one Japanese woodjoinery that dates back to the 17th century. This technique is a complex interlocking joint with a wooden tenon that forms a strong construction.



Figure 14 - Kanawa Tsugi joint





Figure 15 - Kanawa Tsugi test

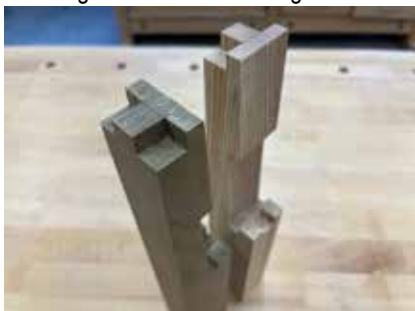


Figure 16 - Kanawa Tsugi test



Figure 17 - Kanawa Tsugi test



Figure 18 - Kane Tsugi test



Figure 19 - Kanawa Tsugi test



Figure 20 - Kanawa Tsugi test

In this early stage of the project, I did a series of material and joinery tests. I needed to familiarize myself with traditional Japanese joints and understand how it is constructed. In the beginning, The first Japanese joint I was exploring is called Kanawa Tsugi, which is an interlocking scarf joint held with a pin. I needed to research what species of wood are native to Japan and what they use for woodworking. After my tests with hand tools, I planned on using the CNC to fabricate the joint to save time. Later in the design, I would change the joint to a traditional Japanese miter joint called Kane Tsugi.



Figure 21 - Kanawa Tsugi CNC test

With a couple of CNC tests, I figured out that our CNC was not capable of fabricating the joint. There were too many variables to consider when using the CNC, such as the feed rate, spindle speed, and the grain direction of the wood. In the end, I decided to go with the traditional way of hand tools for all Japanese joints.



Figure 22 - Kanawa Tsugi hand-cut test

Comparing both the CNC and traditional tests, the test with hand tools can achieve more details and has a tighter joint than the CNC test. The CNC tests have a lot of gaps and the bit went past the profile of the joint, making the overall joint unsightly. I took what I learned from these tests and decided that it is not worth it to continue with the CNC and perfect my skills with hand tools.





Figure 23 - Kane Tsugi Joint

The Kane Tsugi is of Japanese wood joinery. This technique is an integral mortise and tenon held together with a wooden pin. Two pieces of wood are carefully craved to connect without the use of nails or glue, when assembled they form an appealing joint while providing a strong long-lasting joint. This was a good opportunity to play with different tones of wood to highlight the joint.

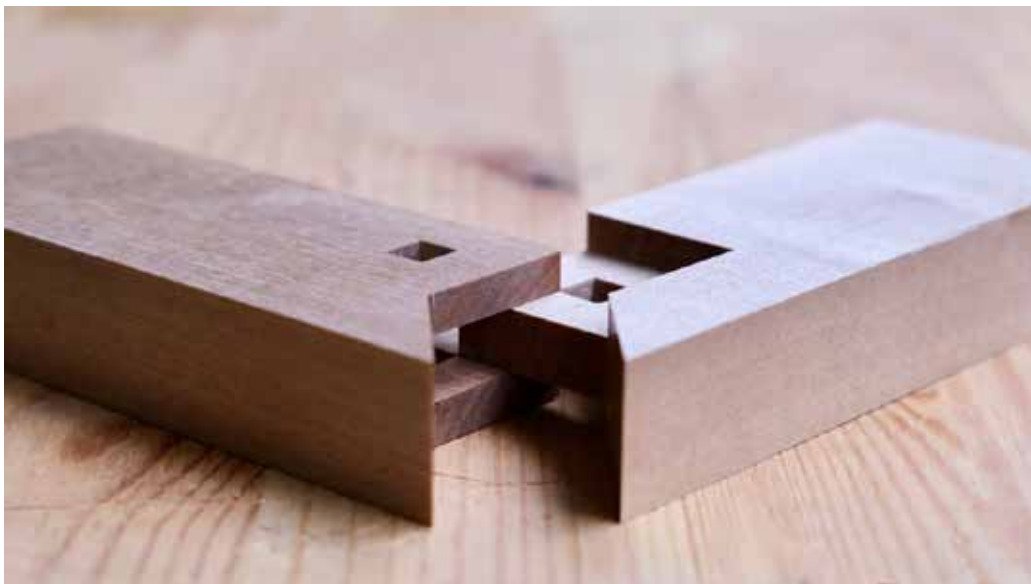


Figure 24 - Kane Tsugi Joint by Dylan Iwakuni





Figure 25 - New Kane Tsugi Joint

The traditional Kane Tsugi joint is a right-angle miter. The design of the leg on the desk is angled, so the design of the joint needs to change to accommodate the angled leg. through several tests and practice with the new Japanese joint, I found a way to fabricate the joint with the slot mortiser and several hand chisels. The only problem I encountered was the shape of the pin that holds the joint together. The new joint is angled, so the pin should change from a square to a trapezoid. This was too much work to create, so I decided to keep the pin square.

Moku-zogan



Figure 26 - Moku-zogan



Figure 27 - Koi Fish Inlay

Moku-zogan which is wood inlay is a Japanese traditional technique to carve on wooden surfaces for decorative elements. Moku-zogan is a practice involving wooden inlays and Kai-zogan is using shell inlays instead.

This technique uses different tones and colors of wood to create different impressions of the piece. Walnut is used as the base to express the wooden inlays because of its grain and neutral color. In my research, a lot of examples of traditional Japanese joineries have different woods to better see how the parts come together. I want to use those examples of using different woods to make the joineries aesthetically pleasing to look at.





Figure 28 - Sakura Kanji Inlay test



Figure 29 - Sakura Kanji Inlay test



Figure 30 - Sakura Kanji Inlay test

I use the CNC to achieve the curving and to experiment the speed of the bit, and to see how fine of a detail I can make with the CNC. Using the kanji word for cherry blossom (Sakura) was a great way to figure out how fine the CNC V-bit can make the cut, and to see what type of wood will respond well to the CNC.



Figure 31 - Cherry Blossom Inlay test



Figure 32 - Cherry Blossom Inlay test



Figure 33 - Cherry Blossom Inlay test



Figure 34 - Cherry Blossom Inlay test



Figure 35 - Cherry Blossom Inlay test



Figure 36 - Cherry Blossom Inlay test

Even though I decided to stop using the CNC for the joinery, it was the perfect tool for inlay work. The CNC has a feature that is meant for inlay and carving using the V-bit. This allows the CNC to make tighter angle cuts and chamfers the edges making it easy to assemble. Traditionally, Japanese woodworkers would use walnuts as the background of the inlay, because having a dark setback makes the inlay stand out. After a few tests with different types of wood, I decided that the branch will be Cherry and the blossom flower will be Hard Maple. For the finish, I wanted the inlay and the walnut to stand out. At first, an oil base finish like Osmo would be my first choice, but playing with Rubio Monocoat, the overall look and feel made the piece look beautiful.





Figure 37 - Cherry Blossom Inlay test



Shoji & Kumiko

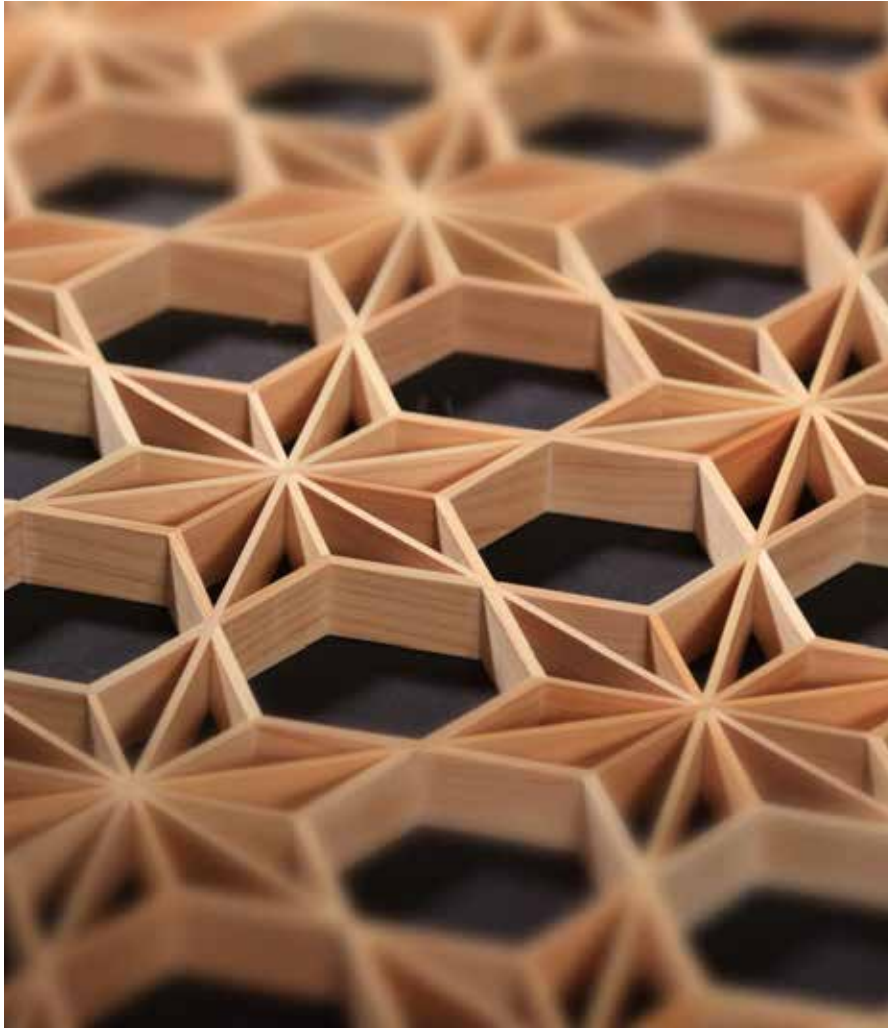


Figure 38 - Kumiko

Shoji can be found in Japanese buildings as sliding doors, windows, and walls made from a latticework of wooden frames with translucent white paper. When in use, they provide light diffusion in any room. Kumiko is a traditional Japanese technique similar to shoji but in a more refined latticework. Kumiko can be found in the same place as shoji, either alongside or be itself.



Figure 39 - Shoji Panel





Figure 40 - Kumiko Inlay test

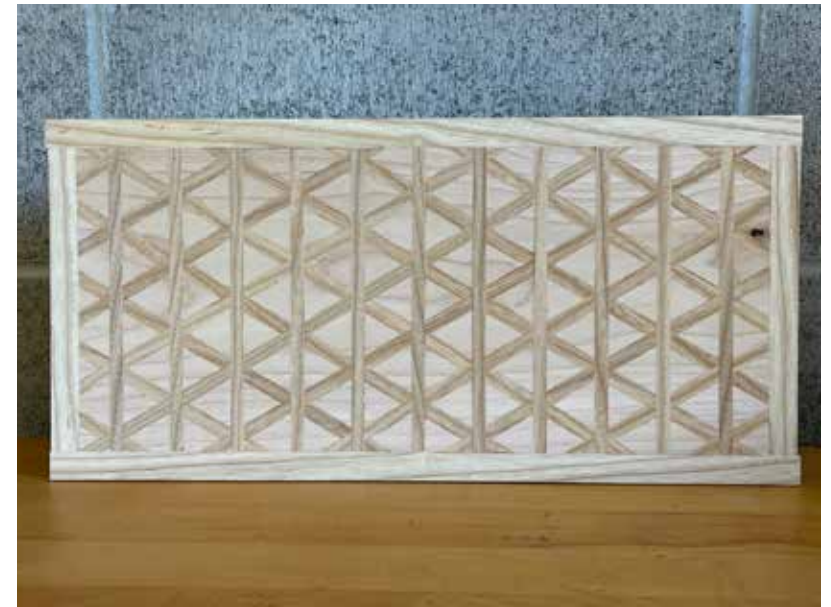


Figure 41 - Kumiko Inlay test

At first, I wanted to incorporate Kumiko patterns in my desk, using the same inlay process as the CNC. I found out that having three Japanese techniques in one piece prove too much and it looked too busy.

The Kumiko pattern was originally on the lantern and the desk divider, but the nature of the design of the Kumiko is too complex and can distract people from the desk inlay. I changed from Kumiko to Shoji, which is a simpler version of latticework.





Figure 42 - Kumiko Inlay test



Figure 43 - Kumiko Inlay test



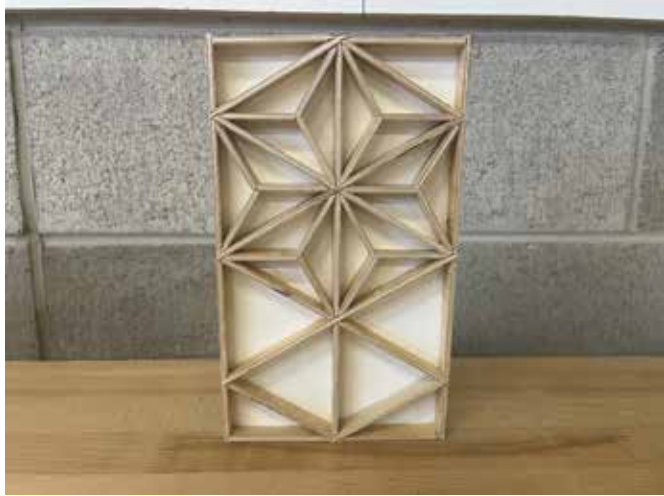


Figure 44 - Kumiko screen test

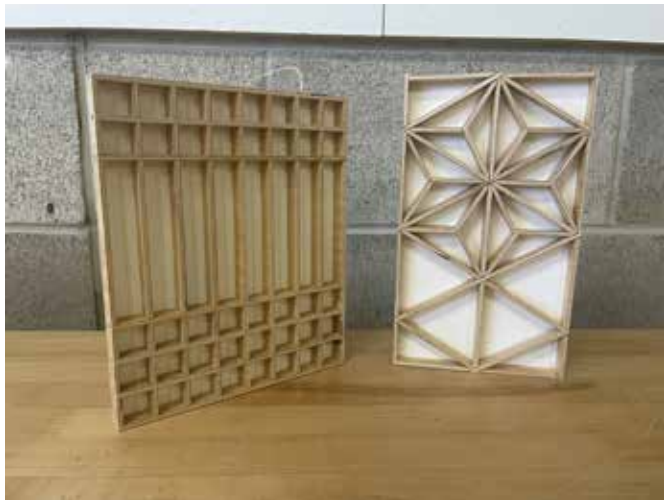


Figure 45 - Shoji & Kumiko screen test



Figure 46 - Kumiko screen light test





Figure 47 - Shoji & Kumiko screen test

In the first few tests of making both the shoji and Kumiko screens, I learned that making the shoji is far easier and faster than the Kumiko. All the cuts can be done on the table saw when making the shoji screen, but when it comes to the Kumiko, some of the pieces have to be done by hand. This process of cutting the Kumiko pieces by hand took too long, and the fit wasn't guaranteed. The tests also used construction paper than the traditional rice paper which was typically used, I wanted to see if the construction paper can be used as a diffuser as an alternative. In the end, rice paper is the better choice for a diffuser for light. The construction paper is too thick to be a diffuser. The test also showed that the shoji is too busy and needs to be more open for the lighting. I found out that the thickness of the outer frame is also too thick, and I changed it from 1" to 3/4" thick material.

Design Objective

When I think about a home office, I think about what kind of furniture pieces might be used. The first image that comes to mind is an office desk, but the kind that is made with cheap material such as white laminate with plastic edging that can easily break off. I also see a huge executive desk that can be made with multiple kinds of materials, these types of desks often display a sense of power that might not fit a home office. I want to create a collection of home office objects that give a feeling of warmth and comfort, instead of stress and the cold feeling of an office room. The objects should offer space for creativity and an immersive environment for the user for everyday work. A space that is filled with intriguing items that are functional. The home office collection poses some major questions such as how to incorporate several traditional Japanese woodworking techniques into a contemporary office room collection. At the beginning of the semester, the idea was to use power tools to do the majority of the work, and then use hand tools to clean up the piece. With different tests, I learned that using machines like the CNC could not achieve the clean and precise lines of the Japanese joinery. My objective for this project is to explore different traditional Japanese woodworking techniques, the following is Sashimono, Moku-Zogan and Shoji. I am also exploring Japanese designers such as Naoto Fukasawa and George Nakashima, I hope to learn from their craftsmanship and principles of Japanese design in my project. Every wooden structure is fabricated with purpose and meaning. My goal is to create functional pieces that pay homage to Japanese techniques, each piece should follow a logical design and construction into a beautiful simplistic collection.

Visual Criteria

Contrast

Repetition

Composition





Be asymmetric but visually balanced with the relation of the desk and cabinet

Consistent straight, sharp, and clean lines

Different tones of wood with Walnut, Cherry and Hard Maple



Inspiration





Figure 48 - Moku-Zogan



Figure 49 - Kanawa Tsugi



Figure 50 - Kumiko Screen

I have always loved Japanese culture and especially their woodworking history. Everything they have created has meaning and logic to their design, there is a purpose to their creation. Those characteristics of craftsmanship are what I want to express in my work. The images represent the visual criteria that draw me in and inspire me to design this collection. These images highlight the natural tones of the material which invokes a feeling of warmth, and the nature of the wood.



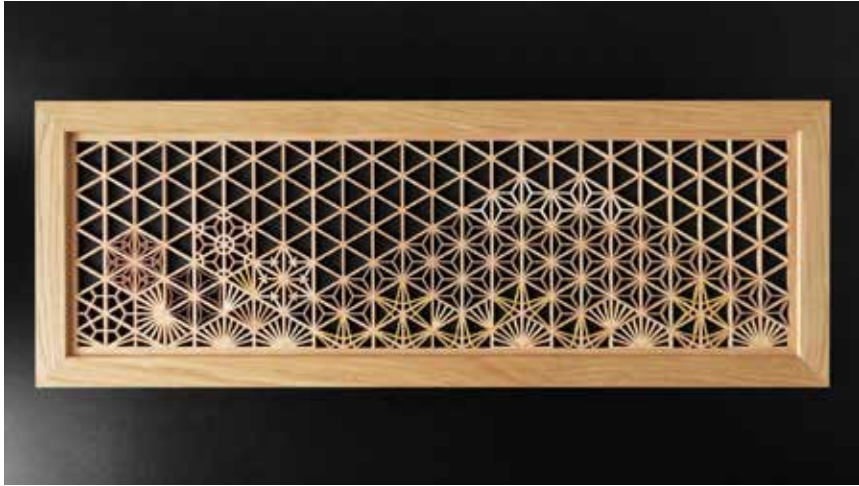


Figure 51 - Kumiko Screen



Figure 52 - Takumi Woodwork



Figure 53 - Japanese Interior

Concept Development



Sakura Fubuki Desk

Sakura

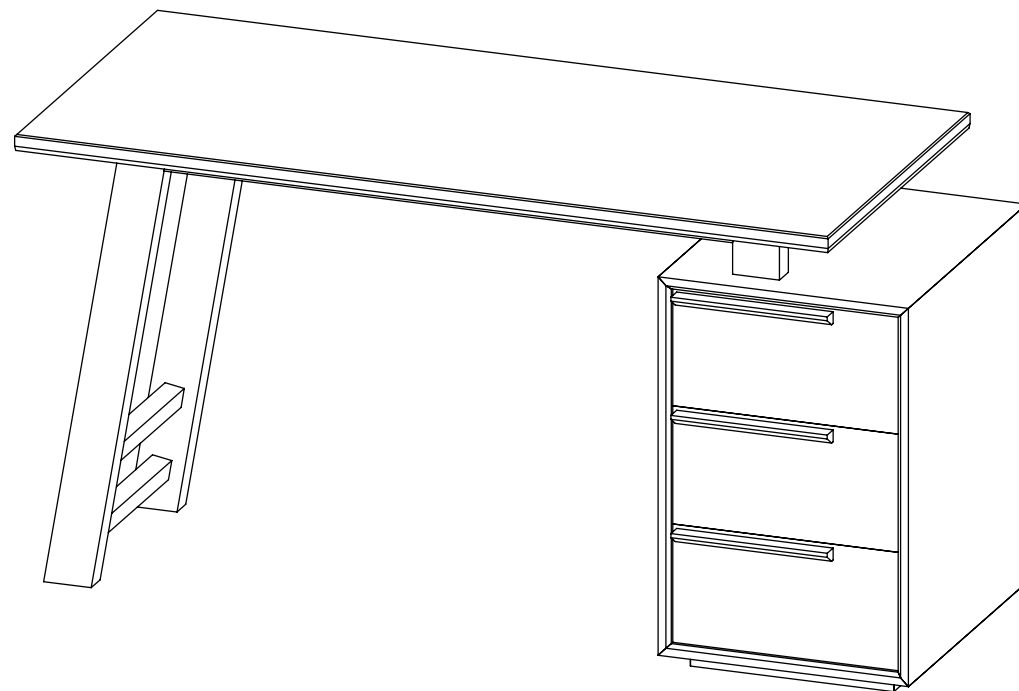
Noun. Cherry blossom

Fubuki

Noun. Blizzard

“Falling Cherry Blossom”





Early Development

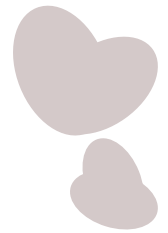


Figure 54 - Groves Night Stand



Figure 55 - Hiroshima Table



Figure 56 - Odakyu Cabinet

I started to look into existing pieces from Naoto Fukasawa. I was looking for what features and designs I can take inspiration from, and incorporate into my desk design. I went through a couple of sketches trying to design different configurations with the cabinet and the desk, playing around with the relationship between positive and negative space. The nature of having one cabinet in a desk means it's either on the left or right side of the desk. Naturally, the desk with the cabinet will be asymmetric, but I need to find balance with the proportion of each component of the desk, including the desktop, cabinet, and leg assembly.



Figure 57 - Desk Sketches

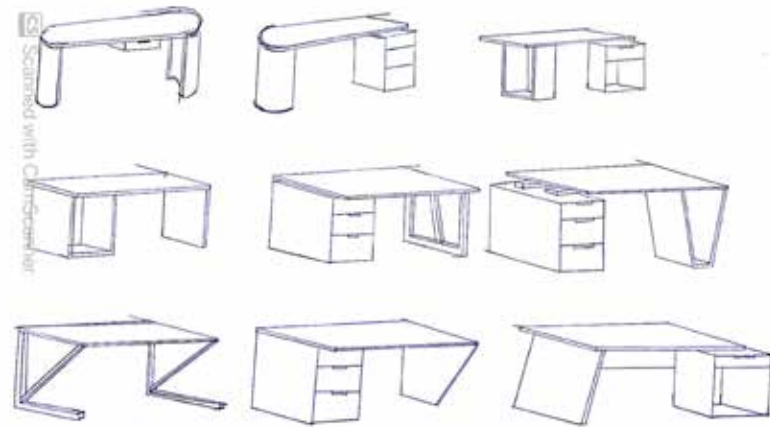


Figure 58 - Desk Sketches

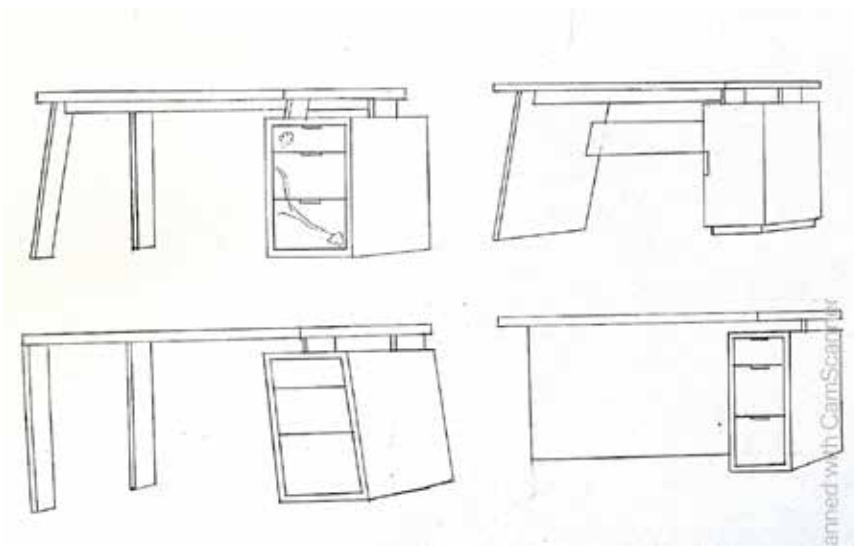


Figure 59 - Desk Sketches

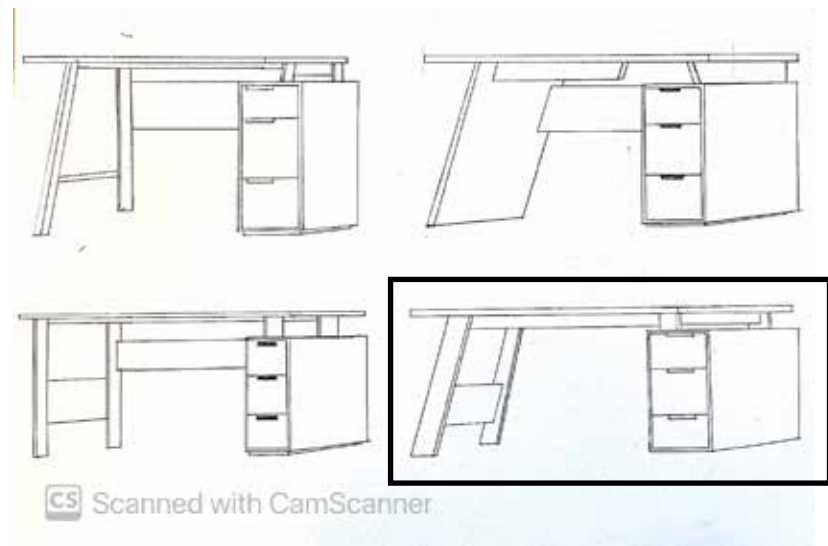


Figure 60 - Desk Sketches

Fabrication



Figure 61 - CNC Inlay



Figure 62 - Thickness Sander



Figure 63 - Dry Assembly

The parts that have inlay are the desktop, cabinet top, and right cabinet gable. The overall CNC inlay process went well without any trouble. The thickness sander was a huge help for this fabrication because it did not tear or dig into the pieces, leaving a smooth surface on the inlays. The thickness sander is also the last step to reveal the inlay work. During the whole process of making the inlay, you wouldn't know what the inlay looks like the unit you run it through the thickness sander. so you can imagine the feeling of doubt about whether or not the inlay will turn out what you have expected.



Figure 64 - Whetstone



Figure 65 - New Joint



Figure 66 - Traditional joint



Figure 67 - Leg Assembly



Figure 68 - Cabinet Assembly



Figure 69 - Dry Assembly



Figure 70 - Dry Assembly

Installing the Blum drawer slides was a challenge during the mock-ups, but after a couple of tests, I manage to understand the installation. For the construction of the drawer boxes, the box is made with Baltic Birch plywood, and the drawer fronts are solid Walnut with solid Walnut handles. I wanted to have different tones of wood for the drawers to adhere to the visual criteria which are contrast.

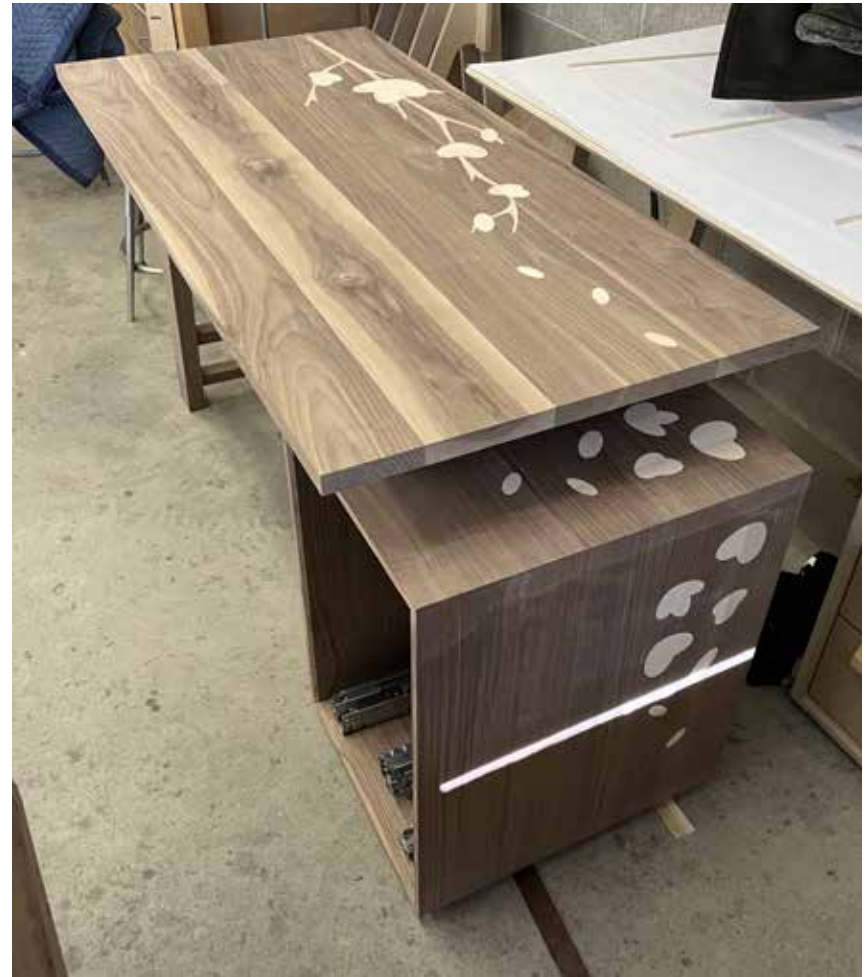


Figure 71 - Dry Assembly





Figure 72 - Final Desk Photo



Figure 73 - Final Desk Photo



Figure 74 - Final Desk Photo



Figure 75 - Final Desk Photo





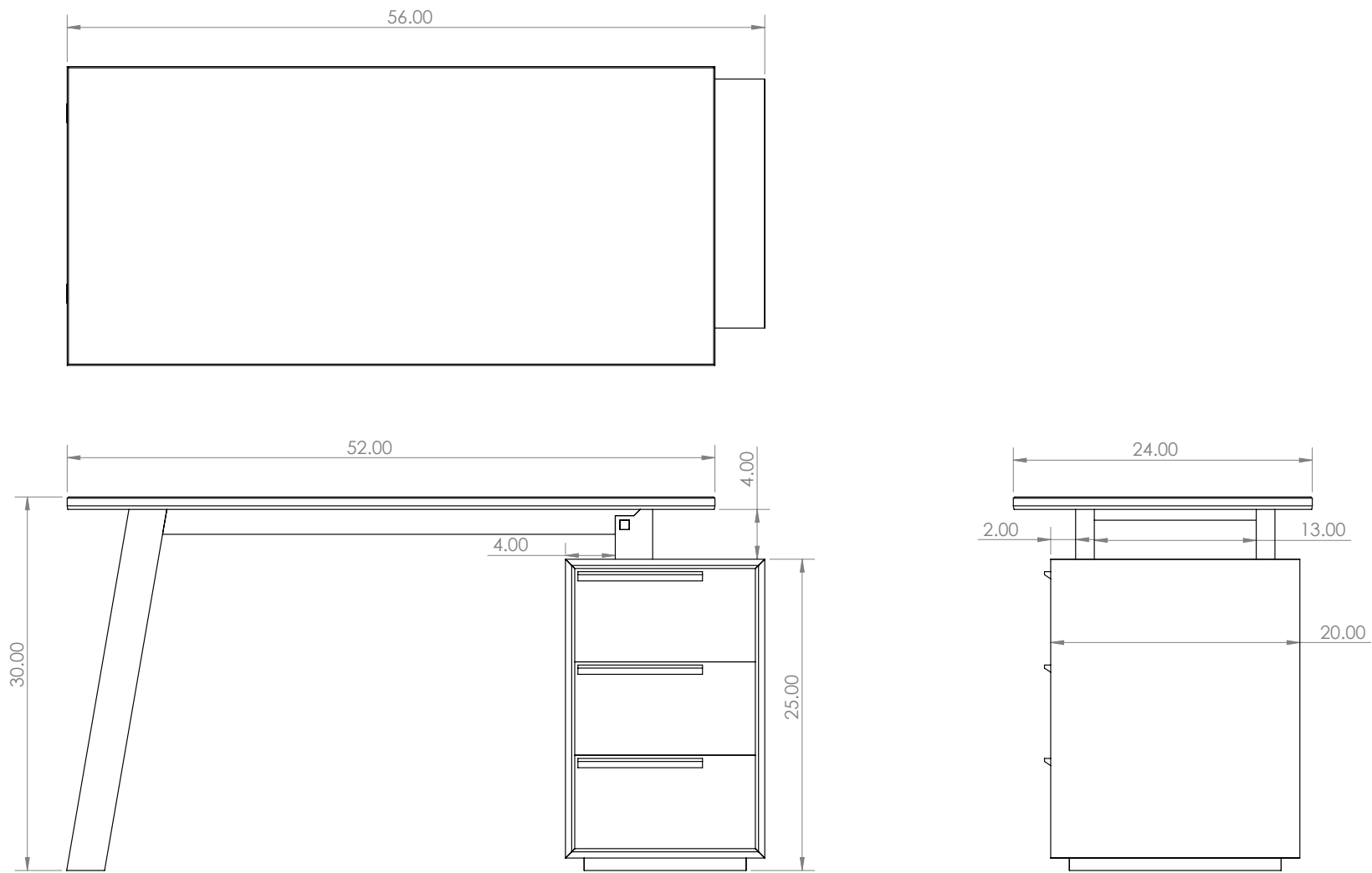


Figure 76 - Digital Desk Drawing

Hana Akari Lantern

Hana

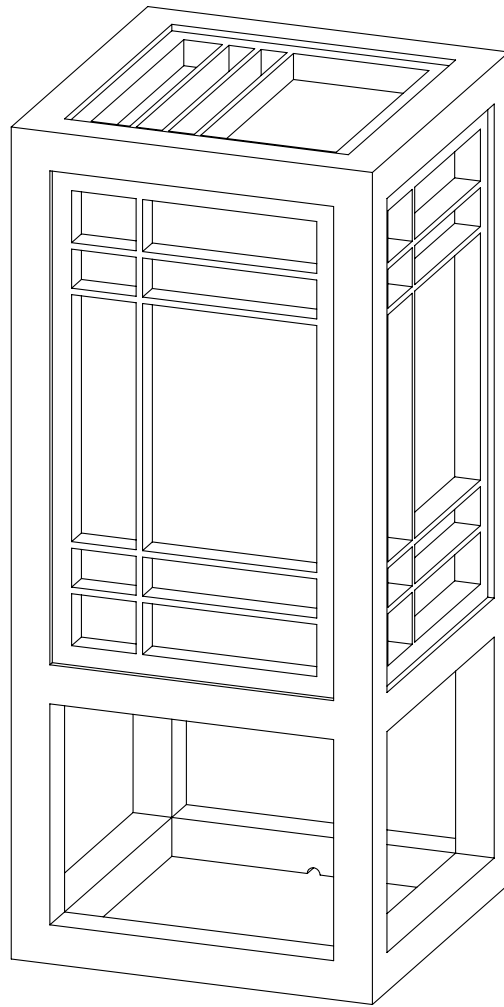
Noun. Flower

Akari

Noun. Glow

“The glow from the cherry blossom at night”





Early Development



Figure 77- Light Prototype



Figure 78 - Light Base

The first iteration of the light was a bit bottom-heavy with the base, and the top little detail was too small for people to notice. The top rails of the lamp are 1/8" inset from the top. The bottom of the lamp has a 3/4" gap with a 1/8" inset from the surface. The first Shoji screen was also a bit busy, for a light, it needed to be simple and have an open space to allow the light to shine through. I needed to figure out what the bottom of the light will look like, should the gap be bigger, or should it be open like the Hanami screen?



Figure 79 - Light Mock-ups



Figure 80 - Light test

Shoji sketch Developments

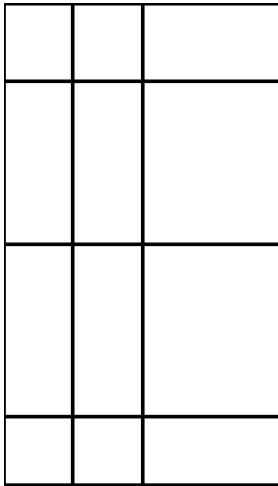


Figure 81 - Shoji Sketches

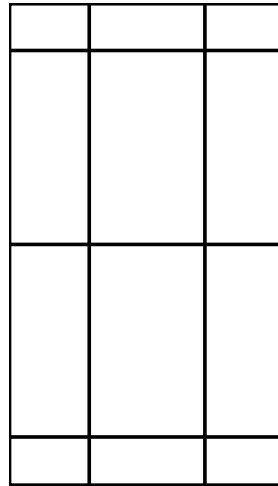


Figure 82 - Shoji Sketches

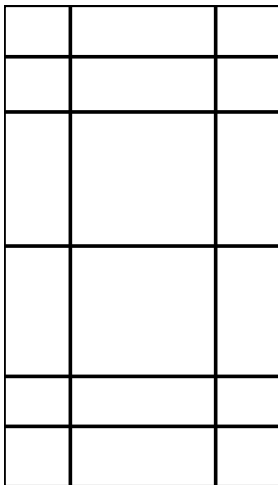


Figure 83 - Shoji Sketches

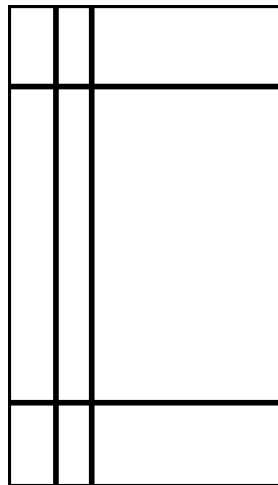


Figure 84 - Shoji Sketches

With the form of the lighting out of the way, I can focus on the Shoji frame. Before, the Shoji was too busy and felt like the light didn't shine through enough. I needed to make the Shoji frame more open for light to come through. I found out with several tests that the frame needed to be thicker. The pieces are 1/8" thick, and the frame was prone to warp. I changed the frame to 3/8" while keeping the rest to 1/8".



Figure 85 - Shoji Lantern



Figure 86 - Shoji Lantern

While making the Shoji screens, I decided to add more details and motifs to the lighting. I played around with the design of cherry blossoms, and I didn't repeat the same design from the desktop inlay to the Shoji screens. I wanted to connect the pieces to each other, so I choose to use just the petals for the lighting. It felt like the pieces are in a collection with the connections of the cherry blossom.





Figure 87 - Final Shoji Lantern Photo



Figure 88 - Final Shoji Lantern Photo





Figure 89 - Final Shoji Lantern Photo



Figure 90 - Final Shoji Lantern Photo



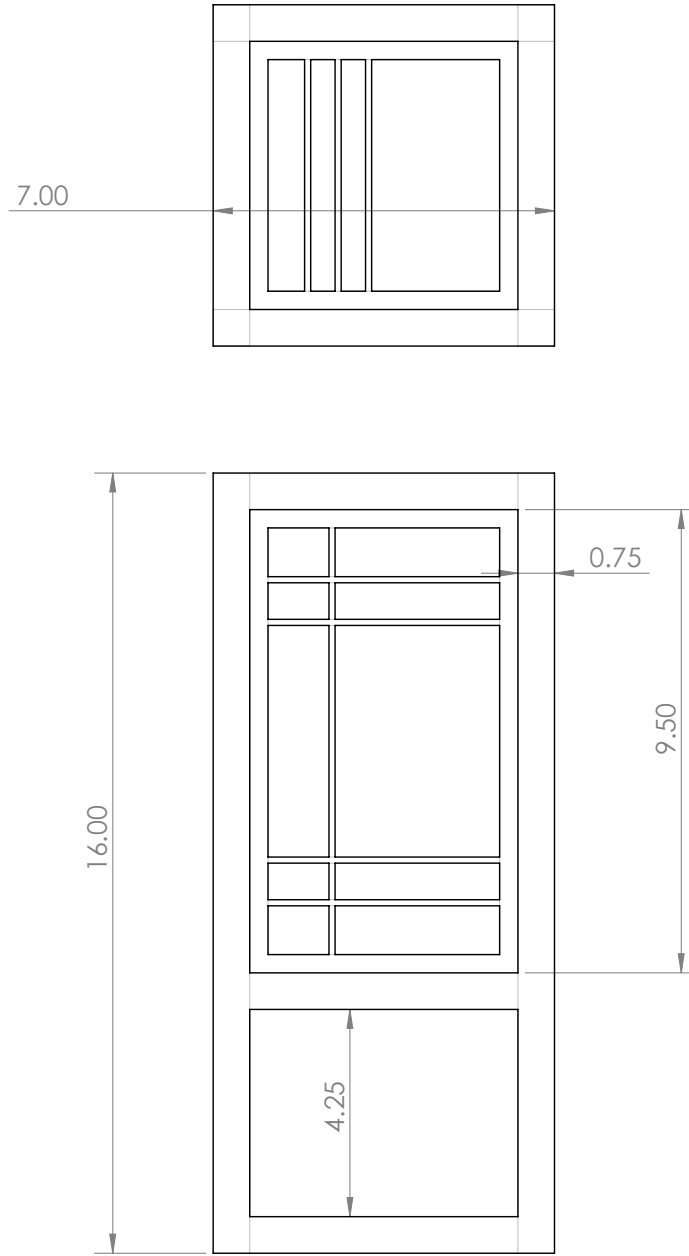


Figure 91 - Digital Lantern Drawing



Hanami Screen

Hana

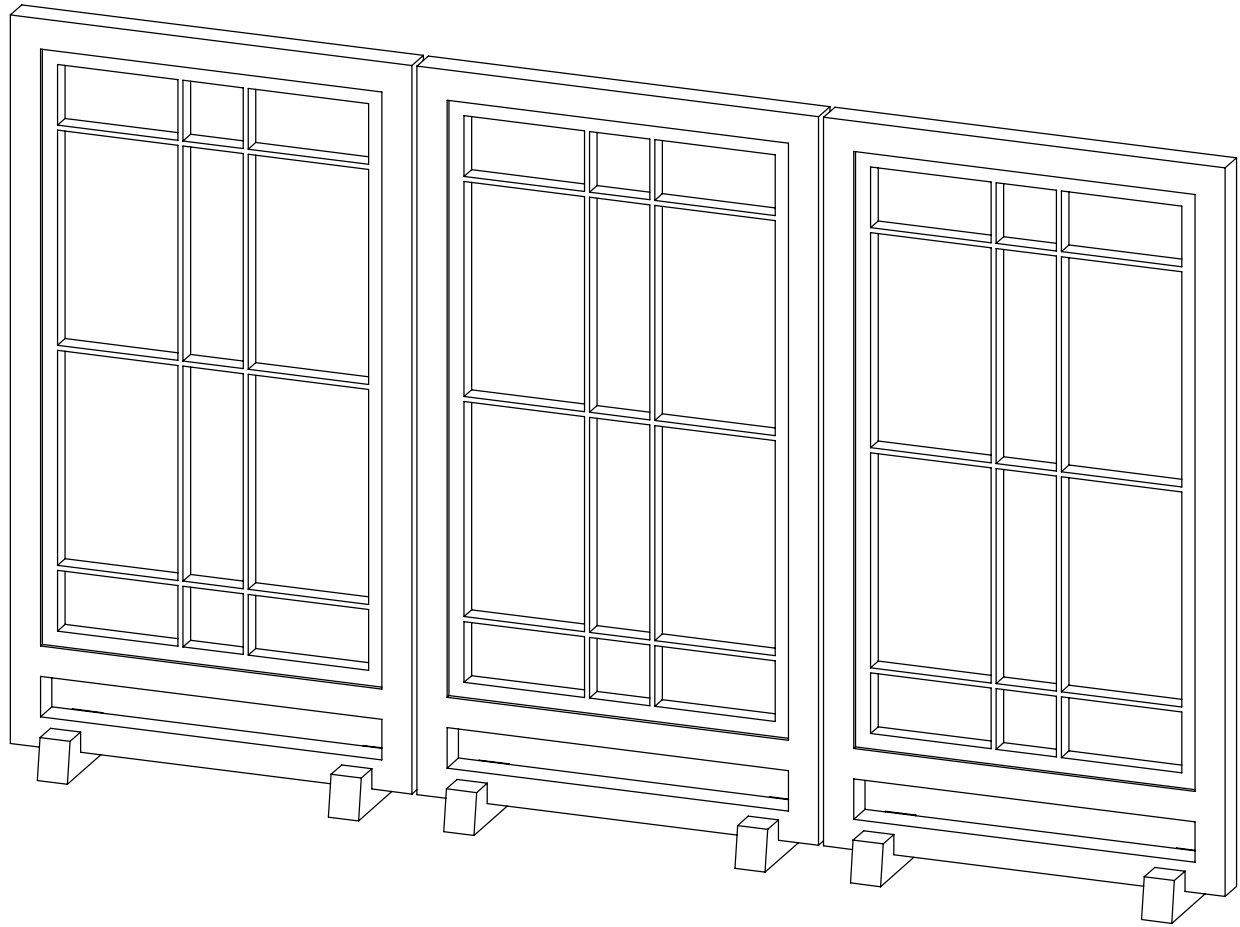
Noun. Flower

Mi

Noun. Watch, or Viewing

“Flower watching”





Shoji Screen Development

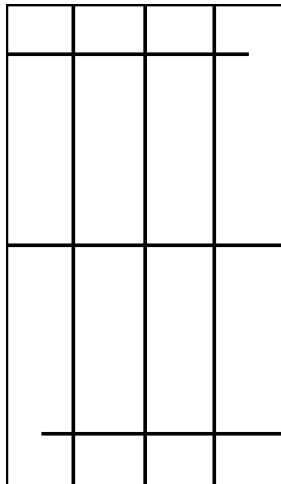


Figure 92 - Shoji Sketches

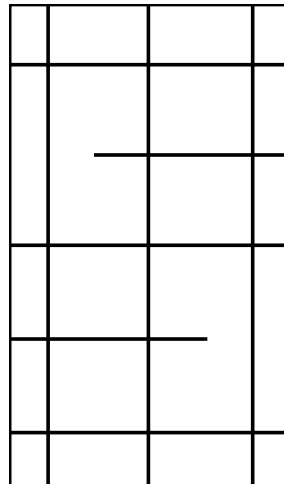


Figure 93 - Shoji Sketches

The design process of the lighting and the Hanami screen were very similar, with the Shoji screens and the construction of the outer walnut frames. The test screen had the same problem as the lighting, it was too busy, and I wanted to simplify the Shoji screen. For this piece, I wanted to add the branch and the petals together on the Shoji screen. Since the Hanami screen won't have light going through, I don't have to worry about the shadow being cast by the cherry blossom vinyl.

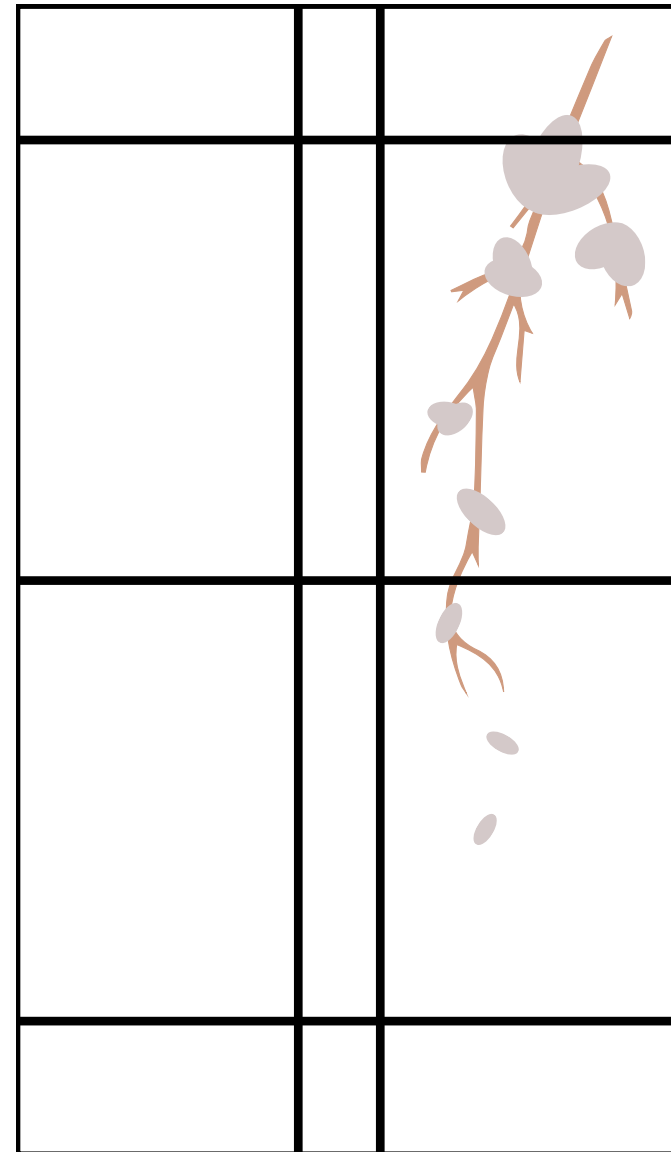


Figure 94 - Shoji Sketches

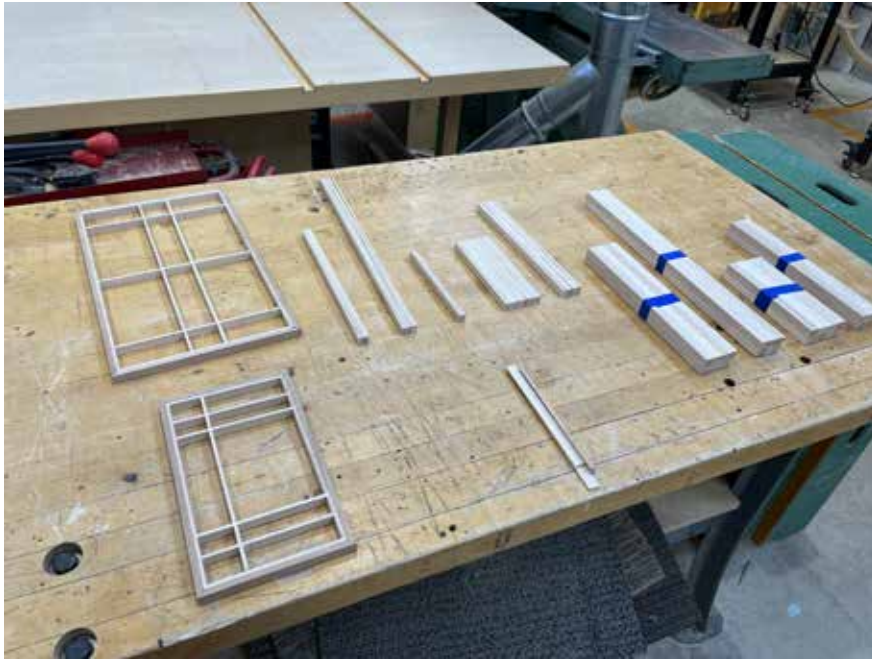


Figure 95 - Shoji Fabrication



Figure 96 - Shoji Assembly

Since I changed from Kumiko to Shoji, all the cuts can be done on the table saw. When assembled, there is extra material on the frames, so I can trim them later when the outer walnut frame is constructed. At first, I wanted to incorporate cherry hard wood for the outer frame of the shoji, but it was too much work, and the pieces don't need to be matching when it comes to material. The reason was that the desk has three types of wood, and I thought that the Hanami screen need to match.



Fabrication



Figure 97 - Divider Assembly



Figure 98 - Divider Fabrication



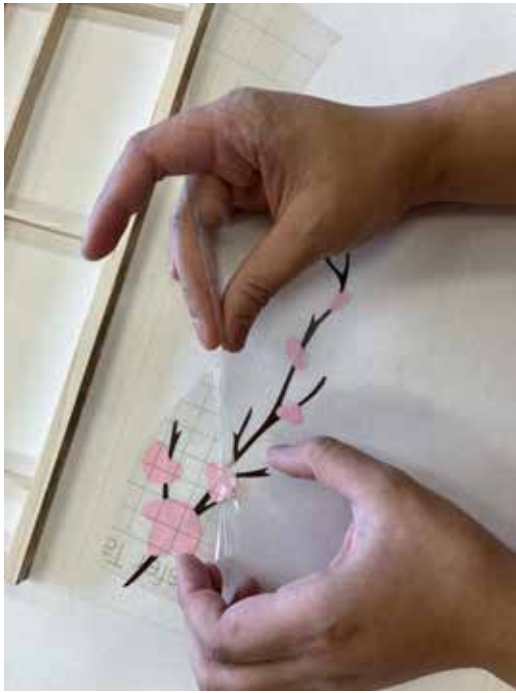


Figure 99 - Cherry Blossom Vinyl



Figure 100 - Shoji Sanding

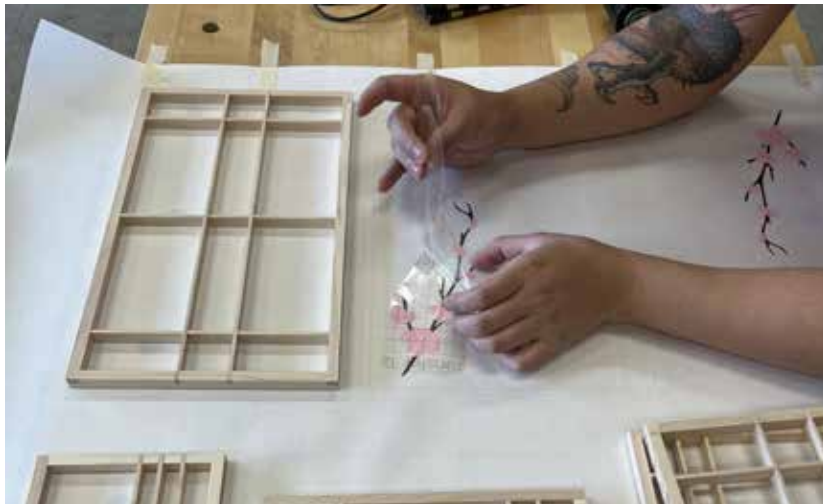


Figure 101 - Cherry Blossom Vinyl

The construction of both the Hanami screen and the lighting is the same as the joinery. Both pieces are made with mortise and tenons, and the tenons are rounded over by hand. The Shoji screens are trimmed and sanded to fit in the outer walnut frame. Then the rice paper is laid out and the cherry blossom vinyl is attached. The Shoji screens are glued and laid on the rice paper.





Figure 102 - Divider with Mock-up





Figure 103 - Divider Screen

With the Hanami screen done, I can compare it with the mock-up piece. The Shoji screens look much better than the mock-ups, it feels more open, and the cherry blossom vinyl looks appealing. After comparing the two, I decided to add feet to the Hanami screen, to help elevate the piece and give it more stability. The feet are removable, so the screens can fold away. I wanted to make the feet out of Maple for contrast and to match the Shoji screens.



Figure 104 - Divider Screen



Figure 105 - Final Divider Screen Photo





Figure 106 - Final Divider Screen Photo





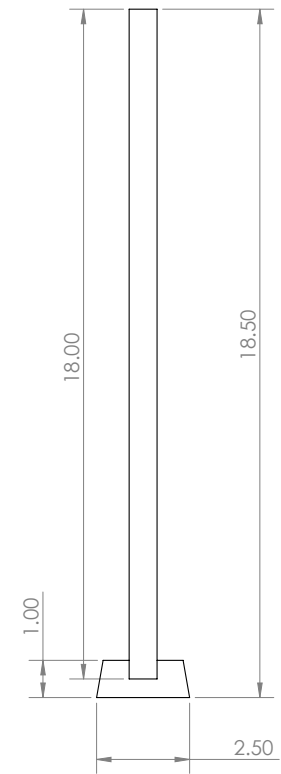
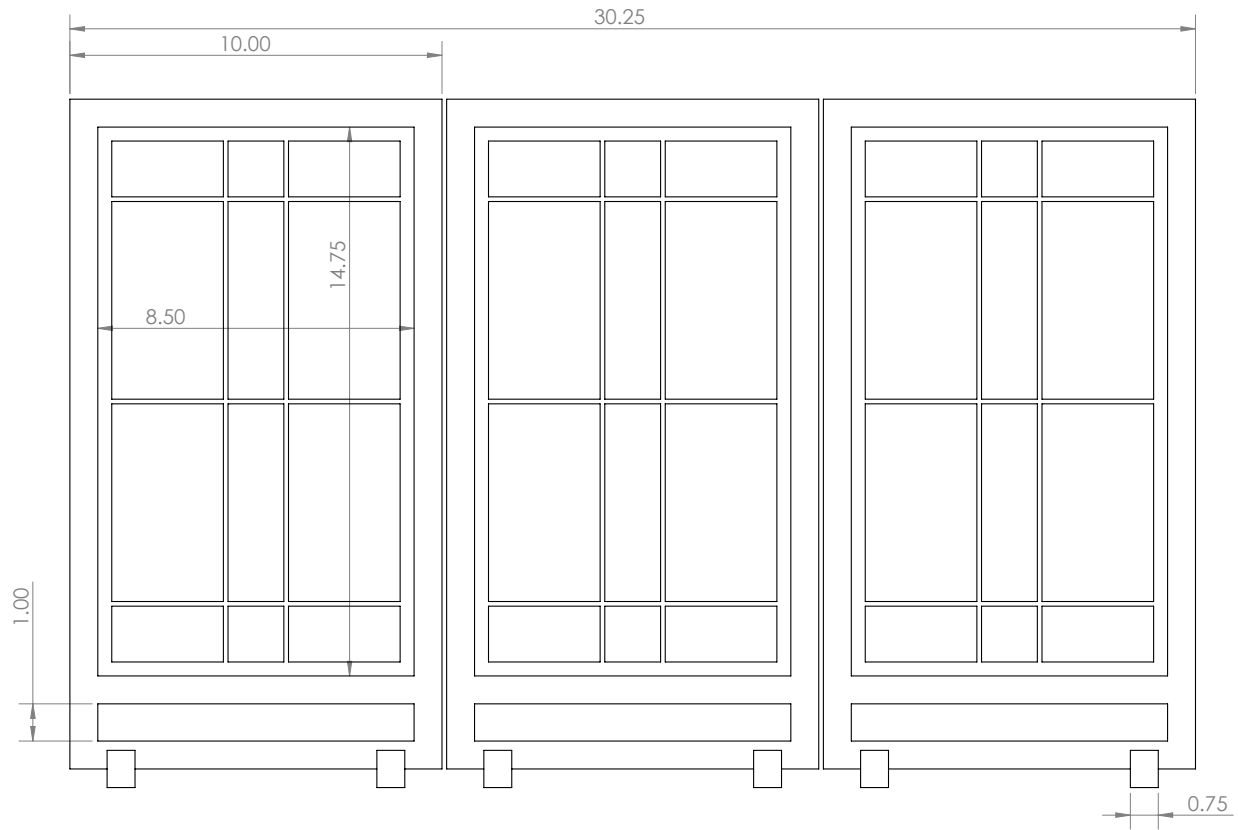


Figure 107 - Digital Divider Screen Drawing

REFLECTION







Figure 108 - Final Collection Photo

The past eight months have been an amazing opportunity to fully dive into one idea for a collection of objects. My goal for this project is to express my love for Japanese culture and its woodworking history through furniture. Japan has a rich history of working with wood and has developed a plethora of wood joinery, both simple and complex, each having a meaning and propose to the design. Overall I believe that I was successful in this path. I was able to recreate and fabricate new joinery for the desk. During the whole process, I enjoyed working with the natural materials and taking advantage of the natural qualities, and having them working with me than against me. In the end, I believe that I have made a collection of functional objects that express my love for the Japanese woodworking and their culture.

Haru Collection

Seeing all of the pieces coming together, I realize the potential of each object in the collection. Seeing each piece in the photo studio, I can see myself using each piece in my life. I am glad that I was able to incorporate Japanese woodworking into this collection and that each piece highlights those techniques. The Desk was a challenge with the inlay and Japanese joints with hand tools. The form of the desk is simplistic giving the Sakura Fubki desk a sense of ease and brightening up any space. The light and divider screens are my first attempt at creating shoji screens. The Hana Akari was a new experience for me to pursue lighting, and how the light shines through the rice paper gives a warm tone feel to the cherry blossom vinyl. I think that I was able to create a piece that represents Japanese Shoji lanterns. The Hanami screen is an opportunity for including brass hardware to abide by the visual criteria. The Cherry blossom vinyl ties all of the pieces together into a collection with the Cherry blossom design.





Figure 109 - Final Collection Photo

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Figure 3-Naoto Fukasawa-<https://www.frameweb.com/article/work/an-objects-user-experience-will-win-the-heart-of-its-consumers-says-naoto-fukasawa>

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Figure 13-Kanawa Tsugi by Dylan Iwakuni-<https://japanobjects.com/features/japanese-joinery>

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