FINAL PROJECT "MeowMate"

A set of table and chairs designed to serve as a bridge fostering close bonds between people and their pets.

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Preface

Last term, I dedicated myself to designing a DIY cat tunnel for pet owners to assemble. This experience was not just an exploration of design, but also an expression of my affection for animals. Through this project, I deeply realized that combining work with interest can bring endless joy and satisfaction. Design is not only about creating a tangible product; it's also a process of learning new skills, cultivating creativity, and daring to experiment. It was a time filled with trials and discoveries, and I felt an immense excitement and pride in realizing the designs I envisioned.

This term, I have decided to continue focusing on cats for my designs. My choice stems not only from a profound affection for these graceful creatures but also from a desire to challenge myself—to delve deeper into a field I have partially explored, to seize the opportunity for free design, and to strive to elevate my interests and design skills to new heights. I aim to create products that are both practical and creative, enriching the lives of cats and their owners, and deepening the emotional bond between them.

In the creative journey ahead, I hope to seize every learning opportunity, whether technical, aesthetic, or practical. I plan to integrate more sustainable considerations into my designs, not only focusing on functionality and aesthetics but also emphasizing the environmental friendliness and durability of materials. Additionally, I aspire to enhance communication with my peers through practice, broaden my design horizon, and create more innovative and impactful works this semester.

In this project, I will begin by clearly outlining each step I will follow and the detailed timing plan. Based on my experience, a clear plan is crucial for enhancing both the learning process and the final outcomes. I have learned from previous projects that with a thorough plan, I can manage time and resources more effectively, making the learning process more systematic and productive.

Phase 1: Research and Testing

Comprehensive research was conducted, including data collection, surveys, interviews, and case studies. Summarized the collected data, drew conclusions, and reflected on them. Tested preliminary ideas, thereby advancing the formation of the product concept.

Phase 2: Design and Implementation

My Steps

Utilized sketches, 3D modelling, and physical model making to transform ideas into visual designs. Produced a variety of professional technical drawings to illustrate the design details. Handcrafted a 1:1 scale prototype to accurately present the design scheme. Photographed the final furniture model, documenting and showcasing the design outcomes.

Phase 3: Evaluation and Reflection

Demonstrated time management skills and learning methods used during the project.

Evaluated the design scheme from multiple perspectives, examining its effectiveness and functionality.

Conducted self-assessment, including self-critique and reflections on achievements and shortcomings during the process. Looked to the future, setting goals and directions for further development.

Time Arrangement

2023 - 2024 From September 26— May 15 (203 days / 29 weeks)

Work arrangement in 7 MONTHS

Sep 26 - Oct 10	Oct 10 - Oct 24	Oct 24 - Nov 7	Nov 7 - Nov 21	Nov 21 – Dec 5	Dec 5 – Dec 19	Dec 19 – Jan 2	Jan 2 – Jan 16
Conduct research and user studies	Use various research method	Gather relevant data	Analyse research	Conclude and Reflecting	Generate initial design concepts	Develop design drafts	Improve the drafts

Research and Testing

Design and Implementation

Time Arrangement

Jan 16 – Jan 30	Jan 30 – Feb 13	Feb 13 – Feb 27	Feb 27 – Mar 12	Mar 12 –	Mat 26	Mar 26 – Apr 9	Apr 9 – Apr 23	Apr 23 – May 7
Revise designs based on feedback	Create handmade and digitally fabricated prototypes	Modifying and upgrading the design (iterative model)	Complete the final design	Arrange works prepare r	finished and naterial	Make a sample of model (1:4)	Make a full-size model (1:1)	Complete the full-size model and reflecting
Break	Full size model making			Full size model making			Writing	

My Stories

I have five cats at home, and these kittens are not just warm companions to me; they are like family. So, when last semester our teacher asked us to design something of our own choosing, I immediately thought of designing for my cats.

This project gives me the chance to build on my research about cats from last semester and to learn even more about them. My motivation comes partly from my love for cats and a desire to give them more love, and partly because designing for something I am passionate about brings me immense joy, as I experienced last semester.

I am fortunate to have another opportunity for a self-directed project this semester, and I have decided to continue designing for cats.























The new Story is

Cats

As I embarked on my research project, my initial step was to fully immerse myself in understanding everything relevant to my subject. My focus: the intricate world of cats and their needs. To pinpoint the direction of my design, I conducted surveys among cat owners, collecting their perspectives and experiences. This vital feedback helped me shape a clearer vision.

After gathering and summarizing the data, I identified the core problems that I wanted to address through my designs. This process led me to reflect deeply on what I had learned and how it could influence my work. My research revolved around three primary areas: the behaviour and preferences of cats, the existing products designed for them, and the interactions between humans and cats.

This structured approach not only enriched my understanding but also paved the way for my next steps in the design process, ensuring that my creative solutions would be both innovative and meaningful.

Research and Testing

Nocturnal Nature

Independence

Territorial Behaviour

Hunting Behaviour

Hiding Behaviour

Body Language

Reaction to Catnip

Hairball Issue

Joy of Pet Ownership

Based on the natural instincts of cats, many designers have created a wide variety of products to meet their needs and behaviours.

Correspondingly, there is a product design tailored to each habit or characteristic of cats.

Cats are nocturnal animals with the ability to hunt at night, avoiding contact with other predators and allowing them to prey on animals with poorer night vision. Cats are relatively independent, sometimes ignoring their owners, entertaining themselves, and preferring solitude. In multi-cat households, each cat typically finds its own territorial space within the home. Cats live more solitarily in the wild to avoid competition for food and mating rights.

Product design for this characteristic of cats

Night Safety Collars: Glow-in-the-dark or reflective collars ensure cats are visible when outdoors at night.

Night Activity Toys: Specially designed low-noise toys that won't disturb the household during night-time play.

Automatic LED Toys: Equipped with motion sensors to light up when approached by a cat, stimulating their hunting and exploration instincts.

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Products

Smart Feeders: Can be controlled remotely or set to feed at specific times, ensuring cats eat regularly even when the owner is away.

Automatic Litter Boxes: Reduce the need for manual cleaning while providing a clean toileting environment for cats.

Interactive Smart Toys: Automatically change movement patterns and speeds to keep a cat's attention for extended periods.

Cats will defend their territory from threats, such as neighbouring cats, dogs, or humans. Cats mark their territory by rubbing objects, showing other cats that they are entering an unwelcome area.

Products

Multi-Level Cat Trees: Offer several platforms and hiding spots, allowing each cat in multi-cat households to find their own personal space.

Customizable Scent Markers: Use cats' preference for specific scents to help them mark territory within the home.

Catnip Sprays: Can be sprayed in areas preferred by cats to enhance their sense of belonging to a particular space.

Cats are natural hunters, sometimes bringing prey home, a behaviour that is a natural part of their development. Successful hunting is key to a cat's survival in the wild, and bringing food home may suggest they think you lack sufficient hunting skills.

Products

Intelligent Tracking Balls: Simulate prey movements with automatic changes in direction and speed, stimulating cats' tracking and pouncing instincts.

Vibrating Toys: Imitate the movements of small animals, attracting cats' attention and encouraging capture behaviour.

Interactive Laser Toys: Generate randomly moving laser dots to encourage chasing and jumping, providing both physical and mental exercise.

Cats find hiding spots within the home, usually in warm or high places. They choose a safe place to observe what's happening around them. Cats are very expressive with their body language; their eyes, ears, and tails reveal their emotions.

Products

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Cats have varying reactions to catnip. Catnip releases a scent that activates the pleasure centres in a cat's brain. Young kittens do not react to catnip until they are a few months old, and catnip is not addictive.

Products

Catnip-filled Toys: Available in various shapes and filled with catnip, providing chewing and batting enjoyment for cats.

Cats clean themselves by licking their fur, ingesting hair in the process. Most hair passes through the digestive tract, but sometimes hair collects in the stomach to form hairballs that the cat will expel. This is a natural behaviour. Some cats manage hairballs well, while others might need special food formulas to reduce shedding and contain high fibber to help hair pass through the digestive system.

Products

High-fibre foods and hairball control snacks designed specifically for cats can help reduce hairball formation and promote digestive health.

Cats are interesting and intelligent pets, providing their owners with many hours of enjoyment. From playful kittens to experienced hunters, observing a cat's natural behaviour can be fascinating. Understanding your pet's behaviour helps you become a better owner.

Products

Mood Indicative Toys: Automatically adjust interaction modes based on a cat's mood changes, such as calm and active modes. Smart Collars: Monitor a cat's physiological data (e.g., heart rate) and feedback the cat's emotional state to the owner through an app.

Recognizing the Core Needs

The foundation of any great design, especially when considering pets, starts with a deep understanding of their natural inclinations and preferences.

For our feline companions, this entails recognizing their love for privacy, elevation, and exploration.

By aligning our design choices with these core feline needs, we can craft spaces that resonate with both our cats' instincts and our contemporary

aesthetic ambitions, and thus create the best life for our cats

Basic Needs





Water



Place to sleep



An enriched indoor environment







Basic supplies

Food



Hunting Instinct

Cats are natural predators with an innate ability to track, stalk, and capture prey. Even domestic cats demonstrate this instinct by chasing toys, insects, or the occasional small animal that finds its way indoors.



Territorial Instinct

Cats are territorial animals that mark their domain through scent-marking behaviours such as rubbing, scratching, and even spraying. This instinct gives them a strong sense of belonging and control over their familiar environment.



Self-Preservation Instinct

When faced with threats, cats tend to avoid or hide as their first response. They seek out secluded places to escape potential danger or unfamiliar people or other animals.





Reproductive Instinct

Cats exhibit strong mating behaviours during the breeding season, often accompanied by an increase in territorial actions, changes in vocalization, and a more active search for a mate.

Grooming Instinct

Cats frequently lick their fur to keep clean, which helps regulate body temperature and is a way to remove parasites and dead skin. Cleanliness is essential for their health and helps reduce the attention of predators.

Based on my experience with cats I know ...

CLIMBING

Every cat owner has, at some point, found their feline friend perched atop a wardrobe, bookshelf, or even on door frames. This behaviour stems from their love for heights and the security and vantage point it provides. Natural climbers

Inherent instincts: In the wild, heights provide cats with a safe position to monitor their surroundings and potential threats. Health benefits: Climbing and jumping between heights also offers physical exercise, aiding in their overall well-being.









Hiding

Cats' tendency to hide has both scientific and behavioural underpinnings. Biologically, cats are part of the Felidae family, equipped with instincts for hunting and nocturnal activities. In the wild, hiding is crucial for their survival and reproduction as it helps them avoid predators. This instinct persists in domestic cats, who often seek out secluded spots at home to feel safe and to observe their surroundings without being noticed.

Moreover, hiding is linked to cats' stress management mechanisms. When threatened or stressed, cats tend to seek refuge in hidden spots, which helps alleviate their anxiety. This behavior is especially prevalent in new environments, where hiding allows cats to gradually adapt. Studies have shown that providing ample hiding spots significantly enhances the well-being of house cats and reduces behavioural issues.











"I can be well-behaved or mischievous"

Sometimes, cats will also let people do whatever they want with them. The picture below is a rare shot of my cat being very cooperative with me. They are like little babies but different. Just because they sometimes suddenly listen to me when I need them, it's as if they understand me.

Cats are often perceived as highly independent and aloof creatures, but they can also display surprising levels of trust and docility, especially with their owners. There are times when cats will allow humans to handle them freely, which includes grooming, petting, and even sometimes playing dress-up. This behaviour is a testament to the trust and comfort they feel with their human companions. It's important to recognize that such tolerance from a cat is a sign of their deep bond with a person, as it goes against their natural instincts for self-preservation and control of their environment. When a cat shows this level of acquiescence, it's a clear indication of their affection and the secure feeling they have in their home environment. However, it's crucial for cat owners to be sensitive to their pet's limits and to ensure that this trust is never betrayed by pushing the cat too far beyond its comfort zone.



At the outset of my creative journey in designing furniture for cats, I found myself grappling with uncertainty about what to create. Directionless, I was unclear about what people sought from their interactions with their feline companions. To clear up this confusion, I decided to turn to surveys to tap into the real desires of cat owners. I hope this method will provide guidance, ensuring my designs are not only comfortable for cats but also meet human expectations for their living spaces. This process marks the beginning of my contemplation and learning; I look forward to it leading me down a path of deeper reflection and innovative design.

Initially, I struggled to find a clear direction, so the survey I was preparing to create did not have a specific focus on cats. I planned to ask a few casual questions about cats, just to get a general idea, as if I were collecting inspiration. This informal approach will allow me to gather a variety of views and insights, which could help refine my thoughts and better direct my research efforts moving forward.

Questionnaire

Psychology of the meow world: decoding your cat's unique	4. Are cats loyal pets? [Single-choice question] *	Hard, hard, chewy toys	
personality traits!	ois	Automatic toys that move	
	◦ No	9. Are cats territorial? [Single-choice question] *	
		o is	
	5. If you have not been home for a while, will your cat miss you the first time she sees you?	° No	
1. Have you seen cats and kittens that have as many emotions as people do? [Single choice	[Single choice question] *		
question] •	o is	10. Whether cats scratch the sofa on purpose to cause havoc or to rub the scratching [multiple	
° is	◦ No	choice]*	
• No		I'm going to sabotage it.	
	 Are cats more like children or mature adults? [Multiple choice question] * 	OMagic Scratch	
2. Do cats express their emotions directly?	OChildish children	I've got it all.	
Example: angry and aggressive, happy and modelled [multiple choice]"	OMature adults		
o is		11. Would a cat prefer to live an independent life at home or be accompanied by its owner?	
o No			
- 10	7. the cat you've seen spends the most time each day in? [Single-choice question] *	[Multiple choice question] *	
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The questionnaire had a total of 13 questions. The main questions were made around the cat's personality. These include the cat's emotions, personality, habits, and hobbies.

I typed out the questions I wanted to ask at a website that specialises in making questionnaires (hhttps://www.wjx.cn). There were right and wrong, single choice and multiple-choice questions. Creating such a questionnaire was to set the stage for my research afterwards. Interviewing people who know about cats can broaden my thinking about cats. Also, it can give me more inspiration and ideas.

How are questions born? & Why am I curious about the answers?



A significant 92.21% of respondents chose 'yes', while a small minority opted for 'no'. The purpose of this question was to explore the possibility of understanding cats' emotions. Personally, I do not believe that cats have emotions as complex as humans, or they may not have any at all. However, my own cats have indeed shown signs of happiness, anger, sadness, and joy, albeit not very overtly. Therefore, I wanted to know if other cat owners have felt the same way about their cats having emotions.



The second question was inspired by two of my cats at home. Our white cat gets quite jealous and often seems displeased when we show affection to other family members (other cats). However, he doesn't express his anger directly at us; instead, he deliberately avoids eating the egg yolks in his lunch, he urinates on our bed, and becomes very reluctant to do anything. Initially, my mother and I were puzzled by his behaviour, but we eventually noticed a pattern: whenever we petted the other cats, the white cat would subtly let us know, "I'm upset."



When I posed this question, I already had an answer in mind, but I was still eager to hear other people's opinions. Diverse perspectives can offer richer insights. According to the results, 63.64% of respondents believe that cats are loyal to their owners, while the remainder do not think so. The number of dissenters has significantly increased compared to the previous question. This suggests that cats possessing unique personalities and a sense of independence is not an uncommon phenomenon.

Whether it's cats I've seen in short videos or my own cats at home, some respond to the sound of my arrival by coming to greet me, while others remain indifferent, requiring more attention from their owners. These observations have led me to consider questions about the personalities of cats. The responses I've received are guiding my future design considerations, as they reflect the varied nature of cat behaviour and the need for personalized approaches in my work.


This question focuses on the personalities of cats. I'm interested in understanding what the predominant traits are in most cats and what characteristics are found in a minority of them. This information could serve as a reference for my designs, catering to the typical cat personality. However, I am also considering the possibility of addressing the needs of cats with less common traits, ensuring that my designs are inclusive of these niche groups.



According to research results, most cats are known to behave like children. However, it is worth noting that some cats have taken on the role of mothers at a fairly young age; in addition, there are also cats that can sense children's emotional changes and take the initiative to go and comfort them; and what's more, they will bravely protect their young masters when danger is approaching. These behaviours show that cats are not only able to play the role of a child, but also show the responsibility of a protector when necessary.



Cats spend most of their time sleeping primarily due to their natural instincts as predators. In the wild, conserving energy through long periods of rest is crucial for survival, allowing them to be alert and energetic when it's time to hunt. When cats are not sleeping, they engage in a variety of activities including grooming, playing, exploring their environment, and interacting with other animals or humans. These activities are essential for their physical and mental health, helping maintain their agility and social skills.



From left to right, the items are a small ball, a cat teaser stick, a cat climbing frame, soft stuffed toys, chew toys, and moving automatic toys. I am trying to understand the types of toys that cats prefer. This knowledge helps identify what interests them and what does not. According to the research findings, cat teaser sticks are the most popular, while soft stuffed toys are the least popular among cats (though these are favourites with dogs). Understanding these preferences is crucial for selecting the right toys to enhance their quality of life.

This phenomenon tends to be more common in multi-cat households like mine. Due to territorial issues, cats may sometimes fight with each other. Particularly during certain seasons, my two male cats can become especially irritable. If one cat lies in the territory of another, it can lead to a physical altercation.



I posed this question based on a specific example. I wanted to explore whether cats' sometimes mischievous behaviour is intentional or unintentional. The survey results indicate that 54.55% of people believe cats do this primarily to sharpen their claws; 38.96% think cats are not only sharpening their claws but also want to be playful; while 6.49% believe cats purely intend to cause destruction. Most people are convinced that the main reason cats engage in this behaviour is to sharpen their claws. However, some cats also exhibit a destructive mindset similar to that of small children.

Some cats are very clingy, while for others, taking the initiative to get close to people is a rare event, akin to a fleeting blossom. In the survey, most respondents indicated that their cats are "accompanied by their owners," accounting for 71.43%. Meanwhile, 28.57% described their cats as "independent." While my own cats are not particularly clingy, they occasionally provide me with those brief moments of happiness, like a fleeting blossom. These results have made me realize that cats that prefer independence are not in the minority.



The answers to this question, in descending order, are: soft comfortable surfaces, hard smooth surfaces, sheltered spaces, enclosed spaces, and on people.

This query indicates that my questions are increasingly leaning towards product design. Different cats have different preferences, and it's important for me to understand the distribution of these preferences. The survey shows that most cats prefer soft surfaces, while fewer cats like to stay on people. Initially, I was skeptical of these results because our family cat loves to be around me while I study. Whenever I am in a stationary state, such as sleeping, it comes over to be by my side. Therefore, I will use this outcome as a reference but will also consider my own observations to refine my design approach.

As expected, everyone wants their cats to be close to them. However, I had anticipated that some might consider the times when they need to concentrate and might not want their cats to be too affectionate during such moments, because it's nearly impossible to reject the advances of a loving cat! This realization made me recognize that even this niche need deserves attention. Through design, we can address the concerns of those who prefer not to be disturbed by their cats when they are busy.

Statistics on results

I gave a questionnaire to 77 people on the 19th of October to research the personality of cats

Summary of the questionnaire

In recent surveys, most respondents perceive cats as having loyal and complex emotional profiles, while others view them as independent and less emotionally involved. This variability in cat personalities underscores the need for personalized approaches in products and environments designed for them. By acknowledging the broad spectrum of cat behaviours—from the affectionate and dependent to the independent and territorial—we can better design spaces and products that meet the diverse needs of these animals, ensuring their well-being and satisfaction in domestic settings. Further discussions have deepened our understanding of cat behaviours and preferences, which is crucial for designing products tailored to cats. The research shows that most cats prefer soft, comfortable surfaces and show less interest in hard, smooth surfaces. Cats have a strong preference for sheltered and enclosed spaces, reflecting their need for safety and privacy. While people generally desire cats to be close to them when needing comfort and companionship, some prefer not to be disturbed by their cats when busy or needing to concentrate. This contradiction highlights the challenge of balancing natural feline behaviours with human lifestyles when designing interactive toys or furniture for cats. According to the research findings, designs should consider cats' preferences for soft surfaces and their need for private spaces, while also accommodating different human lifestyles and needs. Designs that allow adjustable cat interactive toys or furniture can satisfy cats' play needs and reduce disturbances when owners need to focus on work. These research findings provide valuable insights that help us better understand cats' needs and behaviours, allowing us to design products that are both suitable for cats' nature and adaptable to human living environments.

Reflecting writing

Of Creating questionnaires-Completing them-conclude results

During this questionnaire, I gained invaluable experience at every stage from drafting questions to collecting data. Initially, while crafting the survey questions, I deeply considered how to accurately capture the behaviours of cats and the perceptions of their owners. This process made me think more deeply about the complexities of human-cat interactions and the diverse needs that must be considered in product design.

Later, when recruiting participants for the survey, I strived to ensure a diverse sample to broadly represent different cats and household environments. This step not only enhanced the credibility of the survey but also helped me understand the varying needs and expectations different families have for pet products.

In the process of collecting and analysing data, I learned how to filter key information from a large volume of data and support my design ideas with these insights. Analysing this data not only improved my data processing skills but also deepened my understanding of market dynamics and user behaviour.

The entire research process made me realize that a deep understanding of the actual needs of users and pets is key to successful design. This experience has greatly enhanced my research capabilities and problem-solving skills, which will have a lasting positive impact on my future design projects.

After conducting extensive research, I still need to gather more detailed information about cats. I plan to ask my friends about their experiences with cat ownership. They might share similar experiences or offer different perspectives...

Interview





I interviewed two friends who have extensive experience in raising cats. They shared their experiences with various pet products and their cat-raising journeys. Listening to the voices of different cat owners greatly broadened my thinking in the early stages of my design. I took notes while they shared their experiences; I was in a bit of a hurry, so I wrote in Chinese. After organizing the content, here are the summaries:

Friend A, Oscar

About the pet products he used during his time raising cats, he has some experience and suggestions.

Feeding: Firstly, during holidays or times when pets are left alone at home and need feeding, an automatic feeder is an excellent solution, especially for people who often go out and have little time to feed their pets. It is also beneficial for those who are busy with work and tend to forget to feed.

Cat Teaser Sticks: Secondly, when it comes to cat teaser sticks, there are three common scenarios: 1. Some cats are very interested in teaser sticks. 2. Some cats are not interested in them. 3. Cats' interest in teaser sticks fades over time. Most cats end up losing interest in teaser sticks, so they cannot act as a long-term stimulating product like toys. Additionally, teaser sticks require human operation; they are used by people to spark the cat's interest, which is different from the cat's initiative. For example, a cat may be naturally interested in a bird flying outside the window, a pigeon wobbling down the road, or a dog with its mouth open in a car window.

Cat Scratchers: Cats love sisal rope, corrugated paper, and cardboard. These materials allow them to comfortably scratch. However, these materials tend to shed and are not very durable, which might have a lot of room for improvement.

Pet Carrier Bags: The design of pet carrier bags for carrying pets around is excellent. People like transparent materials because they can see the adorable antics of cats; opaque materials are also good as they provide a sense of security for cats. Not only do they allow for safe travel, grooming, and vet visits with cats, but they also offer convenience to humans. Such products meet the needs of both humans and cats.





Friend B, Hoi Ching, has experience with both domestic and feral cats, which have entirely different lifestyles and needs. During the interview, I narrowed down the focus of my upcoming product design to cater specifically to domestic cats.

Scratching Products and Cat Trees: Hoi Ching shares Oscar's sentiment about corrugated paper creating messes that require frequent clean-up, troubling all cat owners. Furthermore, current cat trees and scratching boards are often bulky and take up significant space. People want to provide enough space for cats to play and rest, but assembling and moving these large items is not easy. Moreover, not all cats may be interested in spending their entire day on these cat trees, indicating much room for improvement in these products.

Cat Tunnels: The design of cat tunnels caters to felines' love for hiding. However, these narrow designs, whether integrated into the upper parts of a house or created as standalone products, are challenging to clean. While cats may enjoy these spaces, they often mark their favourite spots by urinating. This can lead to significant doors if not cleaned, requiring considerable effort and time, posing a challenge to cat owners.

Costly: The high cost of pet products is a common issue. Whether it's food or supplies, beneath their refined exteriors, the prices are often not budget-friendly.

Cardboard Boxes: She has crafted cardboard boxes by hand to provide simple shelters for stray cats. In China, every city has many stray cats, quite different from the UK. They live in human communities, with some providing food, shelter, and neutering services. However, cardboard is not waterproof, suggesting a need for a material that is both water-resistant and eco-friendly for handmade crafting.

Cat Litter Boxes: Every cat carries some litter out of the litter box after use, necessitating daily cleaning. This raises the question of whether the design of litter boxes can be further improved to reduce cleaning efforts while still being convenient for the cats.

Destructive Capabilities of Cats: The cats she has raised have inflicted various types of damage on the sofa upholstery, including biting, scratching, and urinating. Sometimes it's entirely unpredictable what objects they might take an interest in, such as sweaters, glass cups, data cables, shoelaces, and seat cushions. Viewing them from a child's perspective makes their actions more understandable. What we can do is to satisfy some of their instinctual needs while also teaching our pets.

Summary & Reflecting

The insights from my friends, Oscar and Hoi Ching, offer valuable perspectives on the interplay between pet products and the daily lives of cat owners. Both highlighted the importance of practicality in pet product design, touching upon the need for items like automatic feeders for convenience and cat teaser sticks for interaction, albeit acknowledging their limitations. They raised concerns about the messiness of corrugated paper in scratching products and the bulky nature of cat trees that take up significant living space.

Furthermore, the challenges associated with cat tunnels and the high cost of pet products underscore the necessity for designs that are easy to clean and economically accessible. The improvisation of shelters for stray cats and the day-to-day struggle with the aftermath of cats using litter boxes point to a need for weather-resistant materials and designs that minimize cleaning efforts.

There's also a poignant reminder of cats' destructive nature, which calls for a deep understanding of feline behavior to create products that can withstand their playful but sometimes destructive antics. Through these conversations, it's evident that designing for pets goes beyond aesthetics to address their innate habits and the practical aspects of caregiving.

The ultimate takeaway is the importance of balancing the instinctual needs of pets with the practical needs of pet owners. This synthesis of feedback drives a design approach that seeks to merge utility with enjoyment for both cats and owners, paving the way for more innovative and sustainable pet product designs in the future.

Cat Cafe Experience

More experiences More rewards!

Despite my frequent visits to pet interaction cafes in Shanghai, where I've had close encounters with horses, raccoons, dogs, and cats, my focus for this design project is cats. Therefore, I am melding my previous experiences with cats with new learning gained from interactions with them. Visiting a cat cafe for field research allows me to observe the daily lives of cats up close and derive inspiration from that. It's an opportunity to identify everyday issues that could be improved for cats. This approach also deepens my understanding of cats—an ongoing process of learning, even with my extensive familiarity.



In narrating my field research experience, I delve into various aspects, including Indoor Facilities, Interior Details, Products & Materials, Feelings When Interacting with Cats, and Observations Learned from Moka. Each perspective enriches my insights and informs my design process.

Indoor Facilities

Firstly, the design of the cat trees considers the cats' needs for climbing and resting. They are not only multifunctional but also harmoniously blend with the interior decor style of the cafe. A large amount of natural wood and sisal has been used, which are materials suitable for cats to scratch and add a touch of warmth and nature to the indoor space.

In terms of the cat trees, there are designs with various heights and shapes, providing options for cats of different personalities and preferences. For instance, some designs are simple and suitable for resting, while others are more appropriate for active cats to climb and play.

Additionally, the interior setup of the cafe, such as chairs and bookshelves, has been thoughtfully arranged to accommodate the shared space between humans and cats. The selection of materials for seating, such as burlap and soft cushions, is aimed at providing comfortable rest and activity areas for both cats and humans.

Details like the cat bed beside the windowsill offer a prime spot for cats to observe the outside, catering to their curious nature and instinct to watch over their environment. The indoor lighting has also been considered to create a cosy atmosphere, making both cats and customers feel comfortable and relaxed.

In conclusion, the interior design of this cat cafe reflects a deep understanding of the physical and psychological needs of cats and the effort to create a harmonious environment for humans and pets to coexist. It provides spaces for cats to rest, play, and move freely, while also considering the convenience of human use. Overall, this is a cat-friendly and thoughtful interior design.





















Interior details

Wall-mounted cat trees and hanging beds showcase inventive use of vertical space, providing cats with places for entertainment and rest, an excellent solution for space-constrained settings. The positioning and height of the cat trees cater to the cats' instinct to climb and observe their surroundings from a vantage point.

Various shapes and sizes of cat beds, both on the ground and mounted on the walls, give felines the freedom to choose their preferred resting spots. This diversity can accommodate the preferences and needs of different cats.

Natural materials like sisal ropes and wooden elements not only offer scratching posts for cats but also contribute to the cafe's natural ambiance. However, these materials may require frequent maintenance and replacement, as evidenced by the visible wear on some cat trees in the photos.

Overall, the design reflects careful observation and understanding of cat behaviour. Designers have to consider feline safety and comfort, integrating interior decoration with functionality, and ensuring harmonious coexistence between cats and customers. While the design is creative and practical, the durability and ease of maintenance are critical factors that should be deeply considered in the design process.

Products & Material



Strengths

1.Interactive Toys: The toys displayed, including the hanging macramé and the toy-filled basket, provide mental stimulation and physical play for cats. They cater to the cats' instinctual need for hunting and pouncing, vital for their wellbeing.

2.Tunnels and Tracks: The track toys on the floor allow cats to engage their curiosity and playful nature, simulating the motion of prey.

3.Scratching Posts: Scratching is a natural behaviour for cats to maintain their claw health and mark territory. The worn scratching post signifies its frequent use, implying its functionality and appeal to the cats.

4.Vertical Space: The utilization of wall-mounted structures offers cats the opportunity to explore vertical spaces, which is essential for their territorial and explorative behaviours.

Areas for Improvement

1.Durability: The apparent wear and tear on some items, like the frayed scratching post, suggest that while the materials are attractive to cats, they may not withstand prolonged use without requiring frequent replacement.

2.Cleanliness: Some toys and play areas look well-used, which is excellent for the cats but could pose cleanliness challenges. Ensuring hygiene is essential, especially in a café environment.

3.Space Efficiency: While offering various activities is beneficial, the arrangement should ensure efficient use of space to prevent clutter and ensure free movement for both cats and visitors.

Overall, the cat café's products seem well-chosen for engaging cats in a stimulating environment. Nevertheless, consideration for longer-lasting materials and space management could enhance the experience for both the feline guests and their human companions.



Feelings when interacting with cats

In the cat café, I understand that they must greet a variety of guests every day, continuously interacting with people who try to engage with them. Not just the cats, sometimes even I feel both resigned and bored by such interactions, which naturally can lead to a loss of interest in people, treating everyone indifferently.

When I approach them, they do not refuse me; when I pet them, they also cooperate; and when I play with them using all my cat-teasing skills, they too enjoy themselves. No wonder people can find mental comfort in a cat café, as these small animals truly are a remedy for stress in this high-pressure world.

Interacting with these cats reminds me of my own at home. Though they gather, each one has a distinct personality. The hairless cat is the naughtiest and the quickest to lose interest in me; the black and white Sphynx is the gentlest, allowing me to pet it anywhere without resistance; the British Shorthair is well-behaved but mostly just wants to sleep; finally, the long-haired Siamese with whom I took a photo, doesn't like being disturbed and will walk away if someone approaches.

In summary, through my experiences at the cat café, I have gained a deeper understanding of the unique personalities and needs of different cats. This has made me appreciate every interaction with these little beings even more, whether at home or while out.

Observations Learned from Moka



Moka is a cat whose mood fluctuates unpredictably when sleeping and waking up. The first time I saw him sleeping, I did not disturb him, even though he was right beside me. I couldn't resist observing him and gently touched him, but he immediately gave me an "do not touch me" attitude. However, he encountered patient me. I decided to wait until he woke up to try interacting with him again, but upon waking, he was still reluctant and uncooperative, trying to keep his distance from me. After walking around the cat café for a while, I came back to find Moka awake, and I attempted to interact with him again. This time, he did not reject me, which was quite surprising. Since all the cats at my home have been raised by me from a young age, I had never experienced a cat refusing my touch before. This interaction with Moka made me realize that building trust with cats is very important. During my time at the cat café, in addition to observing the layout and furniture, I primarily gathered information about the personalities of cats. This effectively provided me with an opportunity to gain a deep understanding of the characteristics of various cats. From this experience, I learned a great deal of valuable information.

After going through various research methods such as reviewing literature, conducting surveys, holding interviews, and visiting cat cafés in person, I have now gathered a substantial amount of information about cats. At the same time, the topic of the thesis I am writing is about designing for pets. Throughout the process of writing my thesis, I have been continuously thinking and reflecting. The concurrent progress of these two projects has been mutually beneficial, enhancing my understanding and enriching my perspective.

About my Essay

With the increase in the number of pets, the design of pet-related products has also grown. This raises a question :

When designers create pet products, are they prioritizing human needs or genuinely centering on the needs of the pets?





As seen in the left diagram, I selected 23 common pet products and charted their ratings using coordinates. The X-axis represents the aesthetic appeal of the pet products, while the Y-axis indicates their functionality. This coordinate system clearly demonstrates how each product performs on these two dimensions.

From the diagram above, it's evident that I categorized the advantages of pet products into five classes: functionality, comfort, aesthetics, safety, and sustainability. Each category is marked in a distinct color behind the most characteristic products. This approach makes it easy to visually identify the strengths and weaknesses of each product.

The problem that leads to this is:



Most pet products are overly idealized from a human perspective



This chart illustrates how factors such as anthropocentrism, market-driven motives, lack of pet involvement, human emotional projection, and a shortage of education and information impact pet product design. Through this causal diagram, I have explained how these elements contribute to products being overly idealized rather than practical. I mainly discuss how to balance the needs of pets and their owners in urban environments when designing suitable pet furniture. I found that with urbanization, traditional furniture designs often fail to meet the needs of pets because they overly pursue human aesthetics at the expense of the actual needs of pets. Therefore, I believe that pet furniture design needs to consider the needs of both owners and pets to ensure the well-being of both parties and maintain a stable relationship.

I also used Maslow's hierarchy of needs to analyse the needs of pets, pointing out that pet product design should prioritize pets' needs for safety, social interaction, and self-actualization. I observed that most pet products on the market are designed from a human perspective, often neglecting designs that genuinely consider pets.

Therefore, I suggest that designers should consider pets' actual needs more when creating pet products and adjust designs based on market feedback to enhance the practicality and safety of the products. Additionally, I discussed how cultural and geographical differences affect pet care methods, and how the future pet supply market should focus more on enhancing pets' quality of life rather than merely substituting for interactions between pets and humans. These findings and suggestions are based on my research and in-depth analysis of the market.

Writing this thesis has made me realize that there is an imbalance in the demand for pet products, and it has also inspired me to find potential solutions. Through this writing experience, I have been motivated to design a product that simultaneously meets the needs of both cats and their owners.

Initial Idea



I wanted to make a product that enabled human-cat interaction

I gathered a lot of information. I learned that human-cat interaction can include activities such as: intimacy, playing, feeding, communicating with it and training it;

People can play ball with a cat, interact with cat toys, groom it, and communicate with it softly in a quiet environment;

People can provide cats with enriched environments, such as building cat trees, providing suitable climbing space, setting up cat dens, etc., so that they can have sufficient space to move around and rest.

I am very interested in the word "SPACE".

Some independent Thinking

To this point, I have received a lot of inspiration from speaking with my mentor.

Our conversation is summarised in the following points

The distance between a person and a cat varies depending on the situation. Sometimes a person won't want to be disturbed by a cat when they are working; when they are resting, they want the cat to be close to them and around them.

The private space of a cat is completely different from the space that accompanies a person. The difference is between a small space and a space where the view can see the person.

Open my mind. I've been thinking about what problems I want to solve for my cat and thinking further and further leads to getting lost. It's actually possible to stop and pick an interesting point to delve into based on my research. Change your way of thinking and don't stick to designing for the sake of designing.

Starting from the feeling of human-cat relationship, we can think about the next step.

I have observed the keyword "space". People and cats want to be close but also want to maintain a certain amount of space. To do that, I need to decide how much or how little "space" we want to have depending on the situation.

The first thing I want to do is to think out of the box and think critically about what interesting designs I can make.









SPACE between Human & Cat

















When you're in the bathroom and your cat joins you, suddenly, standing up seems like an impossible task. At your desk, a warm cat lands in your lap, and just like that, your hands are wonderfully trapped.

Relaxing on the sofa? Well, if your cat has just used the litter box, its tail might not be the kind of company

you hoped for.

And if you're sleeping soundly, beware—the cat that demands pets and won't take no for an answer, turning your peaceful sleep into a reluctant petting session.



I thought back on my own experiences of interacting with my cat, and investigated other people's experiences of interacting with cats to be able to conclude that people and cats need different spaces in different situations.

I wanted to find out how people and cats feel when they interact with each other: whether people want cats to get close to them or whether cats want to get close to people in various interaction scenarios in their lives.

So, I made a list of the most common scenarios of human-cat interactions.

Taking your cat to the pet shop Taking the cat for a bath Travelling with a cat Taking the cat for a walk Taking the cat to the hospital Taking the cat to the Park Taking your cat to a pet friendly store Taking the cat to the café Working with cats Relaxing with cats

Cleaning house with cats Playing game with cats Eating with cats Sitting with cats Sleeping with cats Feeding the cat When you're unpacking When you are using the toilet When you are cooking

Creating

the 2nd Questionnaire

SPACE

Survey: How both feel when humans and cats interact

The format of this questionnaire is different from the previous one, different questions, same four choices. The user only needs to choose between the four options.



These questions are derived from the theme of "Space," encompassing different scenarios of human-pet interaction. Consequently, I have outlined various everyday scenarios of interaction with cats in a household setting. In different scenarios, both humans and cats may have distinct reactions and thoughts. To delve deeper into these interactions, I created 19 specific scenarios for cat owners to respond to. This not only helps them reflect on their relationship with their pets but also enables me to find answers about the ways humans and cats interact.



Cat wants to be close to people

People want to be close to cats

Cats don't want to be close to people

People don't want to be close to cats

*8. Taking the cat to the cafe [多选题]

Cat wants to be close to people
Cats don't want to be close to people
People want to be close to cats
People don't want to be close to cats

*9. Working with cats [多选题] Cat wants to be close to people Cats don't want to be close to people People want to be close to cats People don't want to be close to cats

*10. Relaxing with cats【多选题】

- Cat wants to be close to people
- Cats don't want to be close to people
- People want to be close to cats
- People don't want to be close to cats

3. Eating with cats【多选题】		
	Cat wants to be close to people	
	Cats don't want to be close to people	
	People want to be close to cats	

People don't want to be close to cats

*14. Sitting【多选题】

- Cat wants to be close to people
- Cats don't want to be close to people
- People want to be close to cats
- People don't want to be close to cats

*17. When you're unpacking [多选题] Cat wants to be close to people Cats don't want to be close to people People want to be close to cats

Cat wants to be close to people

People want to be close to cats

Cats don't want to be close to people

People don't want to be close to cats

People don't want to be close to cats

*18. When you are using the toliet【多选

题】

Cat wants to be close to people

People want to be close to cats

People don't want to be close to cats

A friend commented that creating this survey was pointless, questioning the validity by noting that almost no one would prefer their cat not to be close to them. However, this critique has made me realize the importance of my survey even more. It highlights a common assumption that pet owners never need time away from their pets. In reality, some people do wish for moments of solitude, especially when they need to focus.

"How would you stop a cat from coming close to you? That's unrealistic," I've also faced such scepticism.

Thus, the purpose of conducting this survey is to uncover these issues, identify pain points, and explore the concept of "space" where people desire solitude.

*19. When you are cooking【多选题】


I made a simple poster . To attract more people to fill out my research, I prepared some candies as payment for filling out the questionnaire. And placed the questionnaire along with the sweets in the most trafficked area of the school. The next thing to do was to expect the number of people who filled out the questionnaire and the results.



Survey: How both feel when humans and cats interact

Results of the survey

第14题: Sitting [多选题]

选项≑	小计+	比例
Cat wants to be close to people	19	82.61%
Cats don't want to be close to people	4	17.39%
People want to be close to cats	16	69.57%
People don't want to be close to cats	2	8.7%
本题有效填写人次	23	

第15题: Sleeping [多选题]

选项 \$	小计*	比例
Cat wants to be close to people	19	82.61%
Cats don't want to be close to people	4	17.39%
People want to be close to cats	11	47.83%
People don't want to be close to cats	8	34.78%
本题有效填写人次	23	

第16题: Feeding the cat [多选题]

选项≑	小计*	比例
Cat wants to be close to people	21	91.3%
Cats don't want to be close to people	3	13.04%
People want to be close to cats	14	60.87%
People don't want to be close to cats	1	4.35%
本题有效填写人次	23	

Summaries

I collated the data from the research. It was found that the questions with the highest percentage of responses were the following scenarios:

Taking the cat for a bath Taking your cat to a pet friendly store Relaxing with cats Sitting Sleeping Feeding the cat When you are using the toilet When you are cooking

Cats most often approach people when they are Sleeping, Sitting and Feeding. Interestingly, a very large number of people want their cat to be close to them when they are using the toilet. But there are also a lot of people who don't want it.

Some Reflections

After this survey, I realized that apart from those who desire cats to be affectionate, there are also people who prefer cats to keep their distance.

Many designers have created numerous "practical," "cat-engaging," and "owner-satisfying" products to promote harmonious living between humans and pets. However, I began to question why we must adhere to these labels of functionality, utility, and popularity. I believe I can break free from these constraints and dare to explore more audacious ideas...

Now, I'm eager to explore some intriguing designs and broaden my imagination.

Next, I'm going to "stop" cats from closing people.

Yes, I plan to prevent cats from getting too close to people.

This idea is indeed quite unusual.

Accordingly, I should also explore some unconventional designers and their unconventional designs...

Learned from Deigns

Reading makes me learn and think

I read some designs about man's best friend - pets. There is a lot of useful information gained from reading Pettecture. Different designers have different eyes for life, and they pay attention to the various needs of pets. There are certain habits of pets that are often overlooked, and designers have captured these special needs of pets and tailored their designs to them. Whether it is from the perspective of function, shape, material or sustainability, I have benefited from the many innovative designs that have been created.

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《PET-TECTURE》



Katerina Kamprani's "Uncomfortable" series of designs is renowned for its unique creativity and attention-grabbing style. This collection presents everyday items in an amusing yet unsettling manner, rendering them extremely impractical or even absurd. By transforming functional objects into abnormal forms, she challenges our conventional understanding of design, prompting viewers to reconsider the purpose of these items.

Encountering her designs has been truly inspiring for me. Each product seems to have emerged from deep reflection. I imagine she had many thoughts while designing: Why must rain boots hold water? Why must a watering can only be used for plants when it can water itself? Why must a fork be functional? Why must a ruler be measured in units of 15cm? Why must a kettle spout be centred; why can't it be elongated like a mailbox? Why must the opening of a wine glass be upward-facing; why not on the side? And so on. It's as if everything is suggesting that even stones can be soft, not necessarily hard. This is a thinking process I've never experienced before, and I find it incredibly intriguing and innovative.

Leandro Erlich











Maison Fond, 2015 Nuit Blanche 2015, Gare du Nord Paris, France

Leandro Erlich's "Illusionary Architecture" series stands as one of his most creative and artistic masterpieces. Inspired by concepts of illusion and fantasy, this series has produced a collection of breathtaking architectural artworks. Erlich employs reflections, perspectives, and other visual techniques to create scenes that appear real but are impossible.

These "Illusionary Architecture" pieces often leave viewers feeling puzzled and amazed, as they blur the line between reality and fiction. By engaging with them, viewers are invited to challenge their perceptions and understanding, creating an immersive experience unlike traditional architecture.

When I came across his work during my research, it excitedly reminded me of experiencing this "visual feast" firsthand in Shanghai. The third image left a lasting impression on me. I took a photo of a building hanging from a high-rise. However, I was lying on the ground to capture it. At that moment, I found such an experience incredibly intriguing. I believe Erlich also employs a technique of "reflection" to reverse-engineer normal functioning things. Such great designs inspire viewers to contemplate and imagine the real world differently.

Chris Labrooy



Chris Labrooy is a highly creative and talented visual artist and 3D designer whose work is characterised by humour, imagination and technical mastery. His car-themed designs are particularly striking, demonstrating an extraordinary mastery of form and space. Labrooy's work often transforms cars into unusual forms, such as stretching, twisting and splitting, creating a stunning visual effect. His designs are not only bold interpretations of automotive design, but also a rethinking of form and function that pushes the limits of traditional design.

The biggest impression I got from his design is the great visual impact. Conventional things can no longer become conventional. And it makes a machine like a car from cold to very cute and interesting. No one would ever think of combining two cars in a knot. He has boldly realised these "impossibilities" in a visual way. I think this is the key for me to learn.

Some Reflections

Katerina Kamprani's "uncomfortable" product design, Chris Labrooy's creative car design and Leandro Erlich's optical illusion architecture made me feel that design is no longer "limited". I feel that design is no longer a "limitation".

After I researched so many unusual designs, I have grown a lot in this phase of my studies. I used to think that the only thing that could pour water was a kettle. Now I think that a bowl can pour water, a sprinkler can pour water, and even a shoe can pour water. Of course, this is a metaphor. I am now bursting with inspiration and excited to move on to the next stage.

Then I face challenges when it comes to implementing these creative design ideas into the design of a pet cat. After all, no one has tried to make a critical design for an animal yet.

Ideas

Regarding the theme "Space," I was initially thinking about how to prevent cats from getting too close to people at certain times. However, as I pondered this, I suddenly remembered how I enjoy lifting my cats over my head at home, even placing them on my head when they were kittens. Although my thoughts might seem a bit "off track," I couldn't help but jot them down.











At this stage, it's clear that after extensive research, I find myself somewhat bewildered. The design process is indeed challenging and not always smooth sailing. At this point, I decided to shift directions because I realized what I truly wanted to design. On one hand, I am eager to devise a solution that provides more space between people and cats; on the other hand, I also want to enhance the companionship between humans and cats. These may seem like contradictory approaches, but they are strategies tailored to the diverse needs of different demographics. I have put a lot of effort into this. Thus, it ultimately comes down to deciding.

I chose the second option.

After a series of research, I focused on these two things

Cats Like Small Spaces

Evolutionary Biology Perspective: Research indicates that the ancestors of felines relied on small spaces in the wild to avoid predators and ambush prey. This behaviour persists in domestic cats. For example, a study published in the Journal of Animal Behaviour showed that cats tend to seek narrow spaces to hide when stressed or threatened, reducing their anxiety.

Behavioural Psychology Perspective: Cats' choice of narrow spaces is also related to their territorial behaviour. Small spaces make cats feel in control and safe. Psychologists observing domestic cats have found that cats seek spaces that can fully accommodate their bodies, such as boxes and drawers, in new environments, providing a sense of protection and privacy.

Cats Like Sheltered, Secure Places

Animal Welfare Science Perspective: From the standpoint of animal welfare, providing cats with a sheltered safe environment is part of meeting their basic welfare needs. For instance, a study involving shelter cats showed that those provided with shelter boxes exhibited fewer stress behaviours and higher adaptability, indicating the significant role of sheltered spaces in cats' mental health.

Veterinary Science Perspective: Veterinary studies also note that having sheltered spaces can help cats better cope with stressors in the home, such as other pets, children, or household activities. In clinical practice, veterinarians often advise cat owners to provide multiple concealed shelters for their cats to prevent and treat behavioral issues.

The Appeal of Small Spaces

The most convincing theory as to why cats look for small spaces to sleep or hide in is that, as a prey species, they're often targeted by birds and other land carnivores, leaving them vulnerable and craving shelter, says Dr. Karen van Haaften, a clinical behaviour resident at UC Davis Veterinary Medical Teaching Hospital.

Although cats are predators and hunt small animals, van Haaften says that cats feel comfortable when they're out of sight and hide to protect themselves.

Other theories as to why cats like to hide? Thermoregulation (being in tight spaces helps cats stay warm and reflects heat back at them) and the simple idea that, in the same way that getting a hug can make you feel better, cats might prefer touch, van Haaften says.

"There might something rewarding just about having that pressure surrounding their body," says van Haaften.

She also says she thinks exploration might play a factor, too. Like children, cats like novelty and exploring new places.

They Are Hunters

Cats are natural hunters, and their ancestors relied on stealth and agility to capture prey. Small crevices and holes can provide hiding spots that give the cat an advantage when stalking and ambushing prey. The domestic cat's desire for tight spaces might be linked to this instinct, especially if you notice them doing it while playing.

They Are Safe and Secure

Tight spaces offer a sense of security for cats. In the wild, a concealed and confined area can serve as a haven from potential predators. Even though our pets don't face the same threats, the instinctual need for a secure and hidden space remains part of their behaviour. They may also seek out safety when they are around things that make them feel stressed, like loud noises, unfamiliar scents, or other animals.

They Are Getting Warm

Cats are creatures of comfort, and many like warm places. Tight spaces, especially those with enclosed walls, can trap and retain heat, creating a cozy environment that the cat enjoys resting in, especially during the colder winter months.

Marking Their Territory

Cats are territorial animals and squeezing into tight spaces can be a way of marking their territory. By occupying a confined area, a cat leaves their scent behind, subtly claiming the space as their own and establishing a familiar and safe zone within the larger environment.

They Are Curious and Playful

While some cats may prefer to observe from a distance, others are highly curious and playful. Squeezing into tight spaces can be a form of exploration and play for these more adventurous cats, and it can help them get the exercise they need to stay fit.

They Are Stretching

Believe it or not, squeezing into tight spaces might have orthopaedic benefits for cats. When a cat curls up in a small space, it allows them to stretch and flex their muscles, promoting joint health and flexibility.

Psychological Well-Being

It has been proven in both humans and dogs that body compression can lead to a release of endorphins, which can help calm anxiety and result in feelings of calmness and happiness. For dogs, there are various compression vests and thunder shirts on the market to provide them with a "wearable hug". It is reasonable to think that cats may get a similar endorphin boost from squeezing into tight spaces.

Why does cat love to hide in odd spots?

Like humans, cats enjoy retreating to a warm, quiet location for some refreshing downtime.

When your cats need to isolate themselves, they often find safe places in your house to hide such as space under a bed, in a cupboard, or behind the sofa. It's venturing into unsafe zones like an open dryer or under the hood of a car in the garage that can put them at risk for injury or worse, death. That's why it's important to understand why cats like to hide and how you can be sure to keep them safe while they act out this normal feline behaviour.

Why do cats like to hide?

Animal experts believe it's an innate behaviour cats developed in the wild to shield themselves while stalking prey or to protect themselves from becoming prey. That curious behaviour remains, and according to <u>PetMD.com</u>, cats who hide tend to be less stressed than cats who have no place to retreat.

What are the most common places cats like to hide?

Some cats will retreat to a hiding spot just to nap undisturbed. Others may seek refuge if spooked. It's not uncommon for some kitties to make a mad dash for their favourite hiding spot when company makes an entrance, or a new four-legged addition enters the mix. They will eventually emerge from their hidden shelter and leave you wondering just where they've been stowed away during their absence.

The most common safe places cats like to hide include:

Under the bed, behind or inside a sofa (by entering through a hole in the lining), In cupboards, Behind the curtains, In the back of a closet, Behind an appliance, Inside an empty box or grocery bag, Inside a suitcase or backpack, Under a Christmas tree, Under a porch or deck.

Then, there are those risky places cats hide that can be dangerous, such as: Around your car's engine. In drawers. In the dryer or washer. In the refrigerator. Inside the woodstove. Behind a space heater. In the garage. Under a recliner.

We've all heard the horror stories about cats who've fallen victim to a car engine, washing machine, or dryer. Warm places such as woodstoves and space heaters are also attractive, but these can pose a burn risk.

Cats enjoy exploring so when you open doors, drawers, or cabinets, cats can quickly dart inside without notice and become trapped. The underside of your recliner is another unsuspected hiding place that can be dangerous if you release the mechanism not knowing your cat is still under the chair.

Realizing that cats like to explore unusual places, you should always double check to be sure your cat hasn't snuck up behind you and slipped into one of these danger zones.

I found my direction of design through the research. My diverse research methods, including literature reviews, surveys, visits to cat cafés, and direct conversations with cat owners, helped me comprehensively understand the needs of cats and their owners. Particularly, I discovered the conflicting needs for closeness and personal space between people and cats. Faced with design choices, I ultimately opted for a solution that promotes interaction between humans and cats, as it better satisfies the emotional needs of most people and cats. Today's discussion deepened my understanding of user needs and made me reflect on how to find a balance in design that addresses practical issues while considering the emotional experiences of users. It was an enlightening process that underscored the importance of flexibly responding to user needs and finding balance in design as a designer.

Up to this point, my research phase has concluded, and now it's time to start creating my own story.

Start to design

Thinking while sketching



Initially, I wanted to create some "space" to enable harmonious coexistence between humans and cats. I chose the "working" scenario for this purpose. I envision that while people work, cats can also have their own independent space nearby. Thus, although cats and humans share the same room, each has their own little territory.

This idea led to the creation of the "Cookie" desk and "Cheese" desk. Utilizing the characteristic holes in these desks, I plan to add various functionalities. I intend to install many small attachments in these holes to serve as components for cat activities. These could be a platform, a scratching post, or even a tunnel. All these compact designs' quantity and placement can be flexibly determined by the cat owner.

After sketching out the initial designs and discussing with my tutor Paul, I settled on my preferred desk and chair design. We debated whether acrylic could be molded into curved shapes. This reflection made me realize that although I had explored many uses of acrylic last semester, I had never considered that acrylic could be bent. I had assumed that acrylic could only be altered in shape during the manufacturing process (when it's still in a liquid plastic state). Therefore, I decided to experiment with bending acrylic.

Research: ways to bend acrylic



After Paul's tutorial, I was going to take the plunge and try my hand at bending acrylic. At first, I thought it was impossible to bend acrylic without using a large machine. However, after researching and consulting with Paul, I learnt that there are many ways to bend acrylic, so I started to try.

First, start from the research, these are the most practical way to bend acrylic in life. The props you can use are Gas stove, Hot air gun, Soldering gun, Induction cooker. Actually, you can also use an oven. The steps corresponding to the above methods I have put together after learning through these Video's.

Gas stove

Heat gun

	Heating the acrylic sheet	Set the gas hob to a moderate heat, place the acrylic sheet on the metal grid and continuously move the desired curved part of the acrylic sheet over the flame to heat it, keeping it at a distance and heating it evenly.	Switch on the heat gun, set it to the appropriate temperature and wind power, then aim the nozzle of the heat gun at the marked line on the acrylic sheet, keep a certain distance and heat the whole area evenly. Keep heating until the acrylic
My heating after			degree of elasticity.
watching multiple video screen instruction	Bend the acrylic sheet	When the acrylic sheet becomes soft, use protective measures such as gloves to quickly bend it into the desired shape along the line of the desired bend.	Once the acrylic sheet has softened, using protection such as gloves, quickly bend the acrylic sheet along the marked lines to the desired shape. If a more complex shape is required, the acrylic sheet can be placed on a suitable mold before bending.
	Cooling the acrylic sheet	After the acrylic sheet has reached the desired shape, place it on a flat surface and allow it to cool naturally.	After the acrylic sheet has reached the desired shape, place it on a flat surface and allow it to cool naturally. You can also use cold water or ice to speed up the cooling process.

Soldering gun

Hob

Ovens

Heating the acrylic sheet	Switch on the welding torch, set it to the appropriate temperature, align the hot tip of the torch with the marking line on the acrylic sheet, and heat the whole area evenly until the acrylic sheet becomes soft and has a certain degree of elasticity.	Set the induction hob to the appropriate temperature, place the acrylic sheet on the pan or heat pad and evenly heat the desired bending section until the acrylic sheet is soft and flexible.	Place the acrylic sheet in a preheated oven and keep heating until the acrylic sheet is soft and flexible.

Bend the acrylic sheet

When the acrylic sheet becomes soft, use gloves and other protective measures to quickly bend it into the desired shape along the marked line. When the acrylic sheet becomes soft, use gloves and other protective measures to quickly bend it into the desired shape along the marked line. When the acrylic sheet has softened, use gloves or other protective measures to quickly bend it to the desired shape along the marked lines.

Cooling the acrylic sheet

After the acrylic sheet has reached the desired shape, place it on a flat surface and allow it to cool naturally.

After the acrylic sheet has reached the desired shape, place it on a flat surface and allow it to cool naturally.

After the acrylic sheet has reached the desired shape, remove it and place it on a flat surface to allow it to cool naturally.

Let's get practical!

New observations

To find out the most suitable acrylic thickness for table and chair legs. I purchased acrylic sheets of 1mm, 2mm and 3mm thicknesses and of the same size (30*30cm) ready to be tested for bending. I plan to take a quarter of the whole to do the test. So, I first found the cutting machine to cut the acrylic sheet cut three acrylic sheets. Next, I removed the plastic film from the acrylic, after which it needed to be heated with a heat gun. The difference between the cutter cut and the laser cutter is that the laser cut will bake the back of the acrylic, while the machine I am using now will produce a lot of plastic chips. So, I can sense that there are benefits and drawbacks to each of the two machines for cutting acrylic. Immediately afterwards I used a paper towel to wipe away the plastic shavings that had caught on the acrylic, they were so tough that the napkin needed a bit of water to wipe them away. At this stage I was ready to make notes for the three different thicknesses of acrylic boards as I heated them up.

Up until this point I had been sceptical about bending acrylic, after all, I had never tried it before.















1MM

I tried the thinnest acrylic sheet first: 1mm. first I used a heat gun to blow hot air on the first bend and timed how long it took the heat gun to deform the 1mm acrylic with an iPad. Miraculously, it took less than 5 seconds for the acrylic to show signs of deformation, 10 seconds for it to bend significantly, and 25 seconds for it to become as soft as a piece of transparent rubber. At this time, I can easily bend the acrylic, very soft. I turned off the heat gun immediately, before the acrylic "melted". I waited for it to cool down, which took about 2 minutes, and then moved on to the next part of the bend. I found that I didn't really need to wait for it to cool completely, but just waited for the curved part of the strip to settle, and then proceeded to the next step while maintaining the residual temperature. This was a new lesson I learnt during this learning step.

When I made the second bend, I made a lot of new discoveries: 1mm acrylic sheets, even though they can be easily heated in a short period of time, can be too soft and not easily fixed.

It pays to try! But the first time the acrylic sheet was soft and drooping, I was so excited that I could bend the acrylic sheet, it was true! But I was also worried about whether the thicker acrylic sheets I was going to use would be able to be bent in this way. So, I couldn't wait to keep trying.

Right tools are helpful



I began to become progressively more proficient, and I found two small boards to use as my aids in bending the acrylic. It was too hot for me to touch the acrylic directly with my hands, even though the author of the video I researched had suggested gloves for all testers. But my "test piece" was relatively small, and the bulky gloves were inconvenient for me to work with. So, I chose not to wear gloves (don't follow my example). These two small wooden boards really helped me a lot: they can help me shape the softened acrylic sheet; they can help me fix the acrylic position; they can prevent me from being burned when blowing the acrylic with a hot air gun.

The shapes pressed out with the two small boards were both standard and beautiful, so finding the right aids was very important.

Looking back on this experience, I also realised I needed a tool to help me after I had burnt my hands. There are times when it's important to listen to those who have been there, because it helps. Like for example: wearing gloves! I'm happy with where I'm at, documenting like this, taking stock of deficiencies and learning at the same time.



²mm

After completing my first attempt at 1mm acrylic, I followed up with a test of 2mm to see how the process and results differed from bending 1mm acrylic. So, using the same steps as I had just used to bend the 2mm acrylic, I found that it took more than twice as long to soften the acrylic as it did the 1mm, presumably because it was also twice as thick as the 1mm. I repeatedly pressed on the acrylic to check that it was showing signs of softening, and it took nearly a minute of use before the 2mm acrylic was ready to bend. This attempt, I used more time and more force to press the acrylic to get a satisfactory bend. After recording, I found out that it takes more than 1 minute and 30 seconds to make a bend of more than 300-degree angle. After my last experience, I wasn't going to wait for it to cool completely this time, I was going to do the next bends while it was still hot.

This part requires patience, and the ability to be flexible. And I've found that the angle of the acrylic facing the heat blower must be varied. The acrylic bends need to be evenly heated. So, I'm going to be more efficient by wiggling the heat gun while blowing with a small float in mind.



2mm

What I needed by this point was more patience. Because it's a continual repetition of the above steps, repeatedly. Each time you try a different bend and a different height. Take your time and don't be in a hurry, because if you are in a hurry, you'll make trouble. Whenever the "hard" acrylic was softened by my hot air gun like a gummy candy, I even had the urge to change it into any shape. In fact, it really works!

But as I sat back and made smaller and smaller turns, I found it harder and harder. To be more specific: I could notice that this acrylic sheet was changing. Each time the acrylic sheet was heated and then cooled, then heated again, then cooled again made it harder! Because the more time I spent with the heat gun on the latter part, the harder it was to bend it than the "last time". After many trials, I realised it wasn't my fault.

However, I looked up the information and got the message that when acrylic is reheated and cooled, it does not usually become harder. Instead, it will remain relatively the same hardness and strength, unless the temperature of the heating is beyond the heat-resistant range of acrylic, resulting in a change in its structure or annealing. Under normal conditions of use, heating and then cooling acrylic does not usually cause significant changes in hardness or strength.

I wasn't willing to do that, I thought there must be a reason, so I went to look up the relevant books, and that's when I realised the cause.



When using a hot air gun to soften acrylic, it may appear that it is more difficult to soften after cooling and reheating. There may be the following reasons

Excessive heating: If the acrylic is heated excessively during the first heating, resulting in a change in the structure of the acrylic molecules, making it more difficult to soften. Excessive heating can lead to changes in the structure of the molecular chain of acrylic, thus affecting its ability to soften again.

Local structural changes: During the first heating, acrylic may experience local structural changes, such as local melting or local deformation. These structural changes may make the acrylic harder or more difficult to soften after cooling.

Cooling rate: The cooling rate may affect the degree of hardening of acrylic. If acrylic is cooled at a faster rate, it may result in a more stable molecular structure, making it more difficult to soften when reheated.

Identify problems and solve them. Figuring out why problems occur is my learning attitude. In my next test I'm going to avoid all three and try to find the right heating time and cooling rate.



Appearance of bubbles

A 1mm skinny acrylic sheet will not bubble when heated by a hot air gun as much as a 2mm thickness. I observed in my research that other people bending acrylic sheets to determine if the temperature is used for bending is by determining the number of air bubbles. This would also simultaneously solve the last problem I had - overheating. Miraculously, as the acrylic cools, the small bubbles inside disappear as the temperature drops. So the bending test of the 2mm acrylic sheet is done.

3MM



Overall, the 3mm acrylic sheet gave me the impression that it took longer to hold up the heat gun. By bending a few acrylic sheets of different thicknesses, I could clearly feel that the time it took to soften the acrylic was different for each thickness, but the result could be any shape I wanted as long as it became as soft as a rubber. So, I'm back there regardless of any aids you want are available. But the force required also becomes greater as the thickness becomes greater.

After a few more tries like this, I became more comfortable with it from the initial fumbling. Bending acrylic is really fun.
3MM



Bubbles like the ones that appear in the picture are pretty, but they don't look good when too many appear, or they don't go away later. This is the consequence of overheating acrylic heat gun, so I keep reminding myself when heating: almost OK, the temperature cannot be higher. Acrylic conducts heat pretty well, and the higher the temperature, the softer it gets. That's why I often happen to overheat, to make the acrylic softer. With proper heating there is also a problem that occurs, it takes a lot of force to bend it. I've noticed with this process that I must be careful not to push too hard, just enough force from my arm or the acrylic will crack. So, no matter which step should go to a moderate degree. This is the key point I learnt during this hand modelling process.

Take one that's a moderate point.





To be continued

These pictures record me pressing the acrylic sheet with a wooden block to stop it cooling and fixing the form. I kept changing the position and angle of the block so that I could create the most pressure on the acrylic with the least amount of effort. Later I realised that the thickness of the block was too thick to fit it inside the curved section when applying pressure, so I used a pencil instead. In order that the two parts of the curved section wouldn't stick together when heated. Then I used a pencil instead so that the two parts wouldn't stick together after heating. Finally, I used a heat gun to blow on the "untidy" curves to soften them up a bit.

In the end, I got an "unbelievably" curved acrylic sheet. Making furniture out of curved acrylic is no longer an insurmountable problem for me. This is a great breakthrough for my project.

This attempt showed me that bending acrylic is possible...

Thoughts and reflections

This experience of testing acrylic sheets was really rewarding. From the initial scepticism to the subsequent successful experiment, every step of the way has given me a deeper understanding of the properties and handling of acrylic materials.

When I started to prepare for this experiment, I was actually a little hesitant in my mind. After all, I had never attempted a bending test on an acrylic sheet before, and I didn't know if it would be successful. But I still decided to give it a try, after all, how do you know if you don't try?

During the experiment, I encountered some challenges and difficulties, such as how to cut the acrylic sheet correctly, how to control the heating temperature and time, and so on. But I didn't get discouraged, but overcame these problems step by step, constantly adjusting and improving the experimental method.

When I successfully bent the 1mm thick acrylic plate for the first time, my heart was really full of joy and surprise. I couldn't even believe my eyes that the acrylic sheet could really be bent into the shape I wanted! This sense of achievement made me even more determined to continue the experiment.

In the following experiments, I kept on trying different thicknesses of acrylic sheets, and gradually mastered the correct method of heating and fixing the shape. Although I sometimes encountered some accidents, such as air bubbles in the acrylic sheet or overheating that made it difficult to bend, I learnt from my failures and continued to make adjustments and improvements.

Through this experiment, I not only learnt how to handle acrylic materials properly, but also developed the qualities of patience and carefulness. I believe that all these experiences and skills will come in handy in future projects, helping me to better realise my creativity and ideas.

For the future, I am looking forward and excited about acrylic furniture making. I hope to be able to use the knowledge and skills I have learnt to design and produce even more unique and exquisite pieces, so that people can enjoy the beauty and practicality that acrylic material can bring. I also hope to share my experience and results with more people and explore the infinite possibilities of acrylic making together.

Overall, this experiment not only taught me a lot of knowledge, but also made me more deeply appreciate the importance of exploration and practice. I will continue to keep the attitude of learning and exploring and keep improving myself to go farther in the future.

In addition to testing the feasibility of bending acrylic, I also explored methods for joining acrylic pieces. Acrylic is different from typical materials; it cannot rely solely on screws for all necessary connections. I used transparent acrylic, so it was important to consider a connection method that was both aesthetically pleasing and effective.

Since acrylic is a plastic material prone to cracking, using metal screws might damage it. Thus, using transparent plastic screws is a good solution. Additionally, devising an interlocking structure is another effective way to address the joining issue.

Research: Connection of Acrylic

Adhesive Bonding

Using specialized acrylic adhesives is one of the most common methods of joining. These adhesives can cure quickly, forming an almost transparent seam, which is ideal for applications requiring aesthetically pleasing, seamless connections. Common types of acrylic adhesives include cyanoacrylate (commonly known as "super glue") and UV-curing adhesives.

Mechanical Fastening

This method involves using screws, bolts, or other metal fasteners to secure acrylic components together. It provides strong structural strength but may affect the overall appearance, making it suitable for applications where appearance is not a concern, or fasteners can be concealed. Care must be taken during installation to avoid cracking or damaging the acrylic sheets.

Heat Bending and Welding

By heating the acrylic material, it becomes soft, and then it can be bent into shape using specific melds. Welding involves melting the edges of acrylic at high temperatures to merge two parts into one. This method is suitable for creating seamless complex shapes but requires specialized equipment and techniques.

Interlocking and Mortise and Tenon Structures

Design acrylic components to interlock with each other, achieving connection through physical fitting. This method does not require additional materials and can provide a cleaner appearance. It is suitable for smaller structures or those that require frequent disassembly.

V-Groove Joining

Cut a V-groove along the edges of the acrylic sheets, then use appropriate adhesives or heat-welding techniques to secure. This method can enhance the strength of the joint and visually minimize the appearance of the seam. It is suitable for applications that require visual continuity and smoothness.











I have decided to create a set of furniture, consisting of a table and a chair. Before I begin construction, I need to calculate the dimensions of the table to ensure it meets the highest comfort standards. To do this, I will refer to ergonomic principles, which will guide me in determining the optimal dimensions and standards for the table and chair.

Research Ergonomic information



People

I would like to make a desk and chair set that allows interaction between a human and a cat, here is the basic ergonomic information I need as a reference for my design.

Desk size: Usually the standard size of a desk is about 29 to 30 inches (73.7 to 76.2 cm) in height, the depth of the desk is between 24 to 36 inches (61 to 91.4 cm), and the width is between 48 to 72 inches (121.9 to 182.9 cm).

Dimensions when a person sits down: The space required when a person sits down includes both chair and leg room. The standard dimensions of a chair are roughly 17 to 20 inches (43.2 to 50.8 cm) in width, 17 to 20 inches (43.2 to 50.8 cm) in depth, and 17 to 19 inches (43.2 to 48.3 cm) in height.

Cats

Height of cats when walking: cats usually walk at a shoulder height of between 8 and 12 inches (20.3 and 30.5 cm)

Height of the cat when standing up: the height of the cat when standing up depends on its species and size and usually ranges between 12 and 16 inches (30.5 and 40.6 cm).

The height of the platform should be such that the cat can easily jump on it: generally, between 18 and 24 inches (45.7 and 61 cm). In addition, given the cat's range of motion and safety, a platform size between 12 and 18 inches (30.5 and 45.7 cm) is appropriate.

Then

To get closer to the idea what I want

The improvement process





1

The primary idea behind this collection of designs is to create spaces where cats can feel concealed and secure, thereby increasing their likelihood of lingering near people. I want to use acrylic and wood in my designs. The transparency of acrylic allows clear visibility of the cat's charming antics, while the sturdiness of wood provides a secure surface for people to work on.



The concept in the top left corner was the first to spring to mind, subsequently evolving into the various iterations you see. These iterations represent the continual refinement of my thought process. I've adjusted the overall form and optimized details, incorporating the "cookie" concept from my original idea in the second and third designs. The tabletops peppered with holes are for attaching platforms where cats can linger; ribbon-like curves offer sheltered spaces for cats; the horizontal curved platforms serve as walkways or resting spots for the feline; and the independent grooves on the side provide an additional resting place. The designs intuitively express their functionality, so I'm looking to further refine them.

The final two designs with green tabletops were an experiment in removing the curved table corners in favour of simple slanted surfaces. I also added undulating platforms for cats to jump and play on. However, this approach significantly reduces privacy for the cats, which is why I designed an "arch bridge" underneath the fifth table. Looking at it now, this design seems overly complex and less aesthetically pleasing. It's challenging to balance a solid connection with playfulness. Under my own critique, I plan to continue exploring how this set of tables and chairs can be improved. "It" should be better.



2

Following the previous phase of experimentation, a resonating thought in my mind was the need for simplicity—functional yet uncomplicated in form. This led to the creation of this circular table and chair set. I retained the initial elements in the chairs of this set, where silk-like curves outline the shape; the part under the table is designed for the cat to linger, and the hole in the table surface allows the cat to pop its head through and be active. Cats can also navigate through the table corners.

In the prototype behind, I merged the area beneath the tabletop with the table corners, giving cats a larger hiding space. The hole in the tabletop allows cats to peer out and move around. For the prototype table in front, I created a small tunnel between the two circles, allowing cats free passage. There's also a recess on top of the table where cats can look down and observe humans.

Overall, these are two compact sets of tables and chairs. Although they mark a significant improvement in functionality and aesthetics over the previous models, I feel they are not as convenient for humans. The arc design on top of the tables could be restrictive, and the space might not be as free for human use. While minor modifications could refine these aspects, I still prefer the previous idea, which was brimming with playfulness. So I plan to pass on this concept and continue pondering!







This modelling attempt focused primarily on the left side of the table made of walnut wood, where I explored various styles of indentations to find the most aesthetically pleasing design. As I worked in Rhino, I gradually developed a fondness for experimenting with different surface textures. I tried everything from simple lines to complex geometric patterns, each design aimed at enhancing the natural beauty of the wood without losing its original elegance. These added details are not just for aesthetics but also consider practicality and user experience, ensuring that these indentations do not affect the functionality of the tabletop, while also providing a tactile pleasure to the users.

3

The third design extends the original concept, creating a set of tables and chairs combining wood and acrylic. In the design process, I specifically considered the needs of cats, ensuring that the table includes two parts designed specifically for cats. One area provides shelter, while the other allows them to freely move, such as lying down, running, and jumping. Based on these two functions, I designed the acrylic part with multiple platforms, continuing my initial idea of using acrylic panels resembling perforated biscuits, with holes for inserting various components.

Furthermore, another acrylic part adopts a curved design, which is also an evolved version of the initial design. Originally, the multiple curves on the acrylic panel were intended to provide more hiding and entertainment space for cats. Later, considering its large space occupation which might inconvenience human use, I made modifications. I tried changing the direction of the wavy acrylic to stand upright like a chair, saving space while still providing the same functionalities for cats: hiding and resting spaces. Such a space would make cats feel more secure.

In terms of colour choices, I deliberately avoided using transparent acrylic, as cats cannot see certain colours, but they can clearly distinguish light blue.

Using walnut wood enhances the durability and sturdiness of the tabletop.









I continually experimented with rendering to find a style that closely matched my vision. As these attempts progressed, I gradually confirmed the final structure and functionality of the table. Despite this, I was not ready to stop; I felt there was still room for improvement. Therefore, you can see from the renderings that I was experimenting with changes in functionality, materials, and colours. I tried these subtle adjustments to explore different possibilities, hoping to further refine the design to not only meet basic practicality but also achieve higher standards in aesthetics and user experience.

I feel that up to this point, the design can still be further improved. However, at this stage, I must start considering the material issues for this set of tables and chairs. Since the structure of the table part has been roughly decided, I need to begin purchasing the necessary materials. Next, I will perform detailed calculations to determine the types, sizes, and quantities of materials I will need. This process is crucial not only for the realization of the design but also directly affects the cost and feasibility of production. I need to ensure that the materials chosen not only meet the aesthetic requirements of the design but are also practically feasible in terms of cost and availability. Such preparation is vital for the success of the entire design project.



Firstly, I counted the length width and height of each furniture part based on the model. Secondly calculated the different materials used for each part and then assumed that they would be laid flat on a flat surface to get an idea of what the minimum size piece of board and acrylic would be. Finally, I picked out the most suitable wood from Wickes' materials website. That's how I produced what I needed: a full 1500*2000 acrylic board and four long 2400*150 planks.



4

After determining the necessary amounts of acrylic and wood, I will proceed with further enhancements to the design of the table and chairs. This next step involves refining the aesthetic and functional aspects of the furniture to ensure they not only meet but exceed expectations in terms of design quality and user experience.

In the fourth design, I modified a detail, trying to utilize the indentations on the left side of the walnut wood. These indentations reminded me of the tunnel structures designed for hamsters. Cats also like tight spaces, so I created a similar space, which you can see in my rendered images. Initially, I thought of designing a vertical tunnel, but then realized that while cats could climb down to play, it would be difficult for them to climb back up, as the space for cats to jump requires certain conditions, making this design impractical.

Therefore, I tried placing the tunnel horizontally in the middle part of the table. The semitransparent acrylic also allows cat owners to see what their cats are doing, which is quite interesting. When I reached this stage of the design, I suddenly realized that I had been continuously adding features to the design, which made it less cohesive. Thus, I decided to put this piece in the "out" area. I do not intend to continue using this design logic.





5

After reflecting on my previous design, I altered my approach. I still wanted to create a hiding space for cats while introducing an interesting element like hamster tubes. Thus, I considered placing such a tube design under the table legs, which initially excited me greatly as it significantly enhanced the playfulness and interactivity of the space for cats. However, I learned from the design process that it is necessary to consider issues from multiple perspectives. Although this lattice design facilitates storage and creates more space, from a human usage perspective, cleaning these tubes might become difficult, even though cats would likely enjoy playing in them.

Nevertheless, this structure is indeed more stable and durable. I believe I can use the next opportunity to further refine this concept. At this stage of the design, retaining an idea with potential for improvement is already a positive step forward for me. I look forward to synthesizing these lessons in future designs to create products that meet the needs of cats while being convenient for human use.



Final Choice



Introduction

to the

Final Form of the Product



This is a set of furniture designed to foster companionship between humans and cats. The structure is crafted so that while people work, cats have their own areas to freely approach in their preferred manner.

In the early stages of design, I noticed that most pet furniture on the market is cantered around human needs. I felt this was unfair to our pets, which inspired me to create a space that balances the needs of both humans and cats.

I experimented continuously with the table's design, aiming to create a small space where both cats and humans can feel utmost comfort. The curved acrylic provides a sense of shelter and security for cats. There are also custom-made platforms integrated into the transparent acrylic panels, where cats can jump onto the table or rest temporarily—after all, they enjoy elevated spots.

Such a table not only provides a comfortable work area for people but also ample space for cats to perch. Imagine a cat weaving through an openwork stool. It might be snuggling at a person's feet, quietly lying inside the stool, or possibly using the acrylic stool as a springboard to jump onto the table. The rest of its functionality is for the cats to discover!



In Normal Light



Naming and Design Intent

I have decided to name this table "MeowMate," implying a companionship between humans and cats. As the name suggests, it highlights the partnership between humans and their feline friends. This design is not just a piece of furniture; it is also a call to action, encouraging cat owners to spend more time with their pets, enhancing their emotional bond.

The left image shows how MeowMate looks under bright and dim lighting. In the design of this table and chairs, I tried to create a shared space that meets the work needs of humans while allowing cats to move freely. I used modern materials, such as transparent acrylic and dark wood, which not only add visual appeal but also allow owners to observe their cats' activities. The design integrates aesthetics and practicality, especially the curves and platforms designed for cats, which provide fun for climbing and also offer them safety and shelter. I noticed that although such a design improves the quality of life for pets, there is still room for improvement in practicality, particularly in cleaning and maintenance. In the future, I plan to explore using more easily cleaned or scratch-resistant materials to further optimize this design. Overall, this table and chairs aim to provide a beautiful and practical shared space for cats and their owners, enhancing their companionship.

Ergonomic Design

This table and chair design thoroughly considers ergonomic principles to provide a comfortable and practical work and leisure environment for users. The table height of 740mm complies with standard desk heights, suitable for most adults sitting and working, ensuring ample leg space under the desk which helps maintain a correct sitting posture and reduces back stress. The tabletop dimensions, 1350mm in length and 530mm in width, offer sufficient workspace for a laptop, books, and other materials, while the compact width helps make the table suitable for small homes or office spaces.

The chair's dimensions are 300mm x 300mm x 500mm, with a seat height of 500mm that fits most users, ensuring feet can rest comfortably on the ground to maintain a stable and comfortable sitting posture. Although the seat width and depth are relatively small, they are adequate for short periods of sitting, ideal for dining or brief resting. This sizing is designed to save space and enhance mobility, making it highly suitable for modern homes and offices, especially in limited spaces. The overall design also considers interaction with pet cats, ensuring that both humans and pets can enjoy comfort when sharing the space.



Structure Display












Product

Animation Demonstration

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Get new skills

I would like to try animating my 3D models in Keyshot. This will allow the details of the model to be shown more clearly. Not only that, but the overall effect of the model can be shown more vividly with animation. I've never done rendering in keyshot before, but it's not that hard. All I had to do was select the angles and objects I wanted to render, pick the rendering effect and wait for the result.

However, my Macbook doesn't support me in this project. My laptop cannot render even a simple animation. 1 frame of an animation can take almost an hour to render. So I can't even finish my animation which takes only 5 seconds. But that's okay, I'm going to find another way out and I'm determined to make an animation to show my work.



I found an internet cafe called Sidequest downstairs and decided to use their high-end equipment to complete my animation rendering. Everything seemed to be going smoothly, but I encountered the same issue as on my own computer. I clicked render, but the rendering speed was only slightly faster than on my laptop. Considering that the animation I created is less than 30 seconds long, it's hard to believe that such a short piece requires so much time to render.

Presentation Board

MeawMate, a disk designed to foster companionship between humans and their lelino friends, inspired by my observation that most pet furniture prioritizes human nieeds, Meow-Mate offers a harmonious space where both can coexist comfortably.

The desk features curved acrylic panels provid ing cats with a sense of security and custon platforms for jumping or resting. This design balances sesthetic appeal with functionality ensuring cats have their own areas to explori while owners work.



MeowMate

Technical details

Material Walnut wood, Acrylic, MDF

Colour

Walnut Brown, Soft Pink, Black Speckled White

Length/Width/Height Desk 1350*530*740 [mm] Chair 300*3

Features

Built-in pet activity area Cat climbing frame Resting area





Enhanced Interaction Meets Pet Needs High Space Efficiency Easy to Clean and Maintain Multi-functionality

Jesign Iy Xuante Zheng

Reflecting

In this design process, I deeply explored various aspects of the "MeowMate" table and chair design, including its ergonomic considerations, pet-friendly features, and visual performance under different lighting conditions. Through these discussions, I gained a deeper understanding of the complexities of furniture design, particularly how to balance aesthetics with functionality and how to create a shared space that meets the needs of both humans and pets.

I have gained profound insights into how material choices and design dimensions impact user experience, especially in ensuring comfort and safety for both people and cats. I successfully applied ergonomic principles in the practical design, ensuring that the dimensions of height, width, and depth of the furniture meet the basic needs of users. Additionally, I realized the importance of continuously testing and adjusting during the design process, which helps identify potential issues and provides directions for improvement.

Nevertheless, I recognize that there is room for improvement in the practicality and ease of cleaning of the design. For instance, I need to consider using more durable and easy-to-clean materials to enhance the long-term value of the product. Further exploration of pet-friendly designs is also a crucial direction for future work, which includes increasing the activity space for pets and improving the stability of the furniture.

Overall, this design discussions have provided me with a comprehensive understanding of table and chair design and pointed out directions for future improvements. I look forward to integrating these reflections into future design projects to create more aesthetically pleasing and practical furniture products.

Make a Real One

Engineering Sketches

Wood 2000*150*22 mm



On the Hobarts materials website I chose three different coloured acrylic sheets measuring 500*300mm, matte white, black and transparent blue. I also chose two different sizes of matte light pink acrylic sheets of 600*300 and 600*400mm, most of which were used to make my model sample, and to test the feasibility of the 1:1 size model that follows. Next are the materials used for the 1:1 size models, which are wooden boards and large acrylics. They were purchased from Wickes.



The left half pertains to the use of wooden planks. After measuring, I have ascertained that the tabletop requires three and a half strips of wood; the left side supporting the tabletop can be completed by piecing together the remaining planks into a whole.

The right half is the engineering drawing for the acrylic sheets. The curved blue acrylic needs a similarly sized piece for testing—I need to test the feasibility of bending it. I've cut two pieces for the other two sizes of acrylic because they are only 4mm thick; doubling them up will result in 8mm, ensuring a firmer support.

In the bottom right of the acrylic is the column that supports the right side of the table. Clearly, one piece is not enough, so I plan to laser cut all parts first and then purchase the additional materials needed.



This engineering drawing represents a 1:4 scale sample of the model. As evident from the drawing, after final calculations, there are many leftover parts; I have reserved some extra acrylic sheets for testing purposes. The diagram shows the use of wood on the left side, while the arrangement for acrylic use is on the right.

It is noticeable that I have drawn two pieces for certain acrylic dimensions because a single thickness is insufficient. A 4mm thick acrylic sheet is clearly unstable for supporting the weight of a table and items placed on it. Therefore, a minimum of 8mm is required for stability, which means layering two 4mm acrylic sheets. There are four identical blue acrylic rectangles; they are components designed to interlock with the perforated sheet.

First, make a sample Then, make a real one

Model making

1:4 model





Laser cutting is a new skill I learnt in last term, and I am now familiar with it after many uses. I cut the wood part and the acrylic part according to the project drawing I made. The first thing I did after cutting was to find the small insert, I wanted to try and see if the small insert could be successfully inserted into the piece of board with the hole in it, this would require testing.



At this step, I first removed the film from both sides of all the cut pieces. From my previous cutting experience, I learned that the film on acrylic boards also matters. You cannot peel off the film before cutting, because the film serves to protect the acrylic board from the high temperatures of laser cutting. The marks from the laser scorching will remain on the film, not on the board itself. Therefore, the film is typically peeled off after the cutting is complete.

Before assembly, what needs to be done is to revert the pieces back to my design by bending them. Small-sized acrylic boards like these can be handled with a heat gun. I started by bending the largest strip of acrylic to match the shape in the rendering; then, one by one, I carefully bent the smallest parts. This part was the most challenging because their small size made them very hot from the heat gun, meaning I couldn't hold them with my hands directly. Instead, I used two pieces of wood. Ideally, clamps would be best, but since there were no such tools on site, I proceeded with caution using the wood. Despite the small acrylic piece falling several times during the process, it was ultimately successful. The joy returned.



This log captures the moments I spent bending the small component. I noticed that the blue acrylic sheet I chose emits a glow when sandwiched between two wooden boards, likely due to a fluorescent agent—quite an attractive effect that momentarily diverted my attention. But back to the main issue at hand. I was concerned that the unevenness of the component would prevent it from fitting into the designated hole in the board, so I decided to reheat it with the heat gun and applied extra pressure. Unfortunately, the sheet cracked. It was an unexpected outcome, and upon reflection, I concluded that I had exerted excessive force to make the surfaces align too tightly.

Having learned from this setback, I knew I had to be more cautious in my next attempt. I discovered a design that could more securely fasten the small part in the joint, as illustrated on the white paper in the final image. This shape proved to create a stronger connection detail, thus designs often require meticulous attention to perfect. This whole process has been one of making, learning, and reflecting.



Initially, I assumed the issue was with the small component. After attempts to compress it and reduce its size still didn't allow it to pass through the hole I had originally designed, I shifted my focus to the hole itself. Adopting a new approach, I decided to modify the measurements. I went back to the laser cutting room and created oval-shaped holes with heights of 8, 9, and 10mm, whereas the original size was 7.87mm. It turned out that the hole with a height of 9mm was the perfect fit for my prepared small component, leading me to establish new dimensions. This reminded me of the process I went through last semester with my cat tunnel design, where I constantly tweaked the data for the junction of two boards until I achieved success. It felt like a familiar step in the design process.

Showtime of 1:4























1:1 model



Based on the data I had prepared in advance; I measured and marked the dimensions required for each acrylic component. Once everything was set, the pieces were sent to the cutting machine for partitioning. The acrylic sheet, measuring 1.5 by 2 meters, was taller than me, and creating a scale model was both mentally and physically challenging. Only through experience did I realize how laborious it is to handle these materials.

Finding the exact length wasn't easy with such an extended measure, so I turned to the protective cardboard used for the acrylics. By folding the cardboard in half, I managed to create a straight and vertical "makeshift ruler." With this "makeshift ruler," I drew all the lines and effectively transferred my drawings onto the material.



Part 1 Bending

Four ways to bend acrylic

In the workshop, I discussed with Ben the method of breaking and bending acrylic. The heat gun doesn't provide a large enough heating area to bend a large 4mm acrylic sheet. There is a risk that uneven heating could cause the sheet to deform.

Thus, the first method of bending acrylic was invented: a machine that heats the plastic. Underneath the grid iron cover is a machine that provides extensive heating. I placed the acrylic on top of the grid iron cover to fully heat it. Although this machine has a large heating area, it heats up very slowly, and it took a long time to wait for it to reach the sufficient temperature. However, it is safe and suitable for the dimensions of my work.



The second way is to use two heat guns to heat the acrylic sheet at the same time.

Ben helped me make a calculated "curvature maker". This simple wooden device helps to bend the acrylic to the desired curvature of my work. The device works with any heating method. We take a heat gun and heat both sides of the acrylic sheet at the same time. I then used this device and the vertical to make the acrylic sheet heat up and bend freely through gravity. The third method is to put a part of the acrylic into the oven, such as the first bend of the acrylic sheet. This method came about because the edges were not smooth after trying the first two methods. We tried to make the bend flat by using the oven. The temperature in the oven drops quickly when the lid is open, but we need to keep the lid open to place the acrylic. So, I encountered many difficulties at this stage. The fourth method we used involved placing the "curvature device" at a higher position. This device, essentially a makeshift clamp made from three wooden stakes, allowed for easier heating and natural vertical bending of the acrylic due to gravity. Moreover, working vertically also facilitated securing the material in place.

This exploratory and experimental learning process led me to several reflections. Firstly, one must be bold. Without the willingness to try, there would be no outcomes to speak of. Similarly, one must not fear failure. Throughout this trial process, I've come to view failure as a frequent companion. What matters is that I learn from each mistake to avoid repeating them in the future. To be continued.

Testing first



To begin, I tested a green acrylic sheet with the heating machine to see if it could successfully warm up the acrylic. This green sheet had the same width as the acrylic I was planning to bend, both being 400mm wide, but the thickness differed – the test piece was 3mm thick, whereas the one I intended to use was 4mm.

The machine required a substantial preheating time, so while it heated the acrylic's surface, I used a heat gun to warm the inner layer, working on both simultaneously. Once heated, I swiftly transferred the acrylic to a table set parallel to the ground, allowing it to hang naturally and vertically. Up to this point, everything went smoothly.



After testing the machine, I proceeded to test the material. This acrylic piece was an offcut from my earlier cutting session. Though its width and length were different from the final pieces, the thickness was consistent at 4mm. I discovered that, like in my previous experiments, the 4mm acrylic required a longer heating period.

The machine had now reached the temperature necessary to soften the acrylic. With the additional heat from the heat gun, it wouldn't be long before the acrylic could be shaped to my needs.



Creating a Tool to Assist with Bending Acrylic This is a rudimentary, yet effective tool designed to facilitate the free bending of acrylic. We used the dimensions of the whole acrylic sheet to calculate the curvature ratio needed for bending. Only with a precisely crafted curvature tool can the acrylic be shaped into the ideal form I envision.

From this experience of creating a tool, I've learned that the pursuit of perfection on this journey is made easier with the help of auxiliary tools, leading to better results! Of course, I must express gratitude to Paul and Ben for their assistance.



Method A

Initially, I approached heating the acrylic with both anticipation and confidence, as if I were handling a 1:4 scale model... But the outcome fell short of my expectations.

The task of creating a curved shape from acrylic is complex and demanding. Achieving the desired roundness of the curve requires a fine balance between heating and manipulation. A misstep in either could lead to a loss of the material's shape or a failure to bend as intended. I had thought the process would be as smooth as working with the smaller model, but the reality proved to be quite different. Nevertheless, I embrace the challenge.



Method B

When the initial approach of using a heat gun and a curvature jig wasn't yielding results as smoothly as I had envisioned, my attention was drawn to the studio's oven. I proposed to Ben the idea of heating the acrylic piece I intended to bend in the oven, assuming it would fit along with the curvature jig. I visualized the acrylic softening under high heat, conforming snugly to the jig's curve.

Unfortunately, the jig was too wide to fit inside the oven. Thus, I adapted my strategy, opting to use the high heat radiating from the opened oven to warm the acrylic sheet. The oven was preheated to 180 degrees Celsius — the temperature at which acrylic fully softens is approximately 172 degrees Celsius. However, the moment the oven door is opened, the temperature plummets rapidly. Therefore, I had to act very swiftly throughout the process. The moment the oven was opened, I placed the acrylic in front of it, ensuring the part meant to bend was adequately heated. Concurrently, I used the heat gun to apply additional heat.





In my persistent efforts, I had hoped to craft the perfect curvature with the heat gun and oven, but the result was an irregular, wave-like undulation. The edges of the acrylic sheet became unevenly distorted. For a moment, I was disheartened by this outcome and worried about the potential waste of material due to the failed heating attempt. After a while, I scrutinized the acrylic sheet and mustered my resolve, believing in a second chance. I decided to first figure out what caused the undesired effect, then I planned to smooth out the area of the acrylic that was meant to bend before trying to shape it again.

I considered the following possibilities for the distortion: 1. The temperature of the heat gun was too high. 2. The heating technique with the heat gun was incorrect; it shouldn't blow continuously in one spot. 3. The temperature at the heated area of the acrylic wasn't high enough. 4. I heated it too frequently. 5. I allowed too little cooling time.

Uncertain of the exact issue, I resolved to continue experimenting. Facing this challenge, I couldn't just give up easily. So, I picked up two heat guns and proceeded with renewed attempts to achieve the desired curvature.
This part details the process I undertook to flatten the rippled areas of the acrylic.

I started by heating the acrylic once again with the heat gun, but this time I prolonged the heating duration, aiming for a softer texture. Once the entire cross-section of the acrylic softened, I was ready to press it down with a pre-prepared flat wooden board. The weight of the board alone wasn't sufficient, so I placed a heavy object on top of it to exert pressure on the "stubborn" acrylic.

After applying as much pressure as I could to flatten the acrylic, I noticed the results weren't quite significant, prompting me to split the task. I planned to heat and flatten each side of the acrylic separately. After heating one side, I immediately used the board and clamps to apply pressure, securing the justflattened area. Continuing with this method, a visible improvement was achieved by the end. The previously "wrinkled" acrylic appeared considerably more level.













Before





Repeat

After reshaping the acrylic to a flat state, I positioned it back onto the arc apparatus, now modified to a standing design for easier access and natural curvature forming. However, this also necessitated a ladder for height advantage. Standing atop the ladder with a heat gun in hand, I reheated the acrylic at the desired bend. Upon heating and bending, the sight of the jagged arc initially disheartened me. Nevertheless, I found that holding the heat gun closer for a while, allowing the acrylic to reach a higher temperature, proved effective. With patience, I evenly heated the acrylic with the heat gun. This time around, I was less concerned about the outcome; past failures seemed to have improved my mindset.

Eventually, as seen in the third image, I achieved a nearly perfect arc! From the side, the fit against the arc apparatus was snug and orderly, which brought me immense joy. The efforts had borne fruit.

The image captures my workspace, showcasing the tools and techniques utilized in the final bending of the acrylic. Perched atop a ladder, I used a heat gun, angling it downward to warm the acrylic evenly from above.

The second photo documents the softening process, where the rigid acrylic required heating from both inside and outside. This method ensures the material is heated thoroughly and evenly across all areas.





I'm finally making a nice curve!!!



Trace

The acrylic, marked with traces of multiple heating and cooling attempts, bears the imprints of my earnest efforts to achieve a smooth curve. Despite the lack of experience and the slight imperfections, the distinctive "texture" created by the heat isn't just a natural manifestation—it also symbolizes the numerous trials I've undertaken.



The task of bending the acrylic is now complete. The next step involves trimming the excess upper portion. By measuring the actual height of the table, I determined the redundant segment and used the workshop's sawtooth cutter to remove the superfluous part of the acrylic. Seeing the culmination of my prolonged efforts brings a flood of mixed emotions. It took nearly an entire week to master working with this acrylic material, but at last, the results are tangible.



End of bending

Finally, as the bending of the acrylic nears completion, the result presents some discrepancies from my original vision; notably, the structure is shorter than anticipated. Upon reflection, I realize that while the calculated proportions of the curvature were precise, the issue lies in the inadequate length of the sections connecting the curves. The base dimensions are correct, but each layer above it gradually shortens compared to the base, pinpointing where the shortfall occurs. Consequently, the top appears disproportionately longer than in the design, a result of not allocating sufficient length for the flat layers in the previous steps. Despite considerable effort, I am not entirely satisfied with the outcome and plan to remake it when time permits, aiming for a more faithful execution of my initial design.

Part 1 Reflecting

In the workshop, my collaboration with Ben on the complexities of heating and bending acrylic has been a profound learning experience. Initially, we experimented with a heat gun, but quickly realized that it didn't provide an adequately large heating area for bending a large 4mm acrylic sheet, which led to the risk of uneven heating and deformation.

This challenge spurred the development of our first method using a machine designed to heat the acrylic more uniformly. By placing the acrylic on top of a grid iron, which allowed for extensive heating, we managed to mitigate the risk of uneven heating. However, this method tested our patience with its slow heating time, although it ultimately provided a safer and more controlled environment for heating larger pieces of acrylic suitable for my project dimensions.

Not satisfied with the speed of the process, we explored using dual heat guns to increase the efficiency of heating. This method seemed promising in theory but executing it effectively required precise coordination and timing to avoid overheating or warping the material.

Our inventive journey continued as Ben assisted in constructing a "curvature maker," a simple wooden device that guided the acrylic into the desired shape as it heated. This tool was crucial as it allowed the acrylic to bend naturally under gravity when heated from both sides, achieving the curvature required for my design without manual manipulation, which could introduce imperfections.

However, not all methods were successful. The oven technique, which involved heating the initial bends of the acrylic, highlighted the challenges of maintaining temperature and handling the material. The quick temperature drop when the oven door was opened posed a significant obstacle, leading to multiple trials and adjustments.

Our final method, placing the curvature device higher, facilitated a natural vertical bending through gravity, simplifying the process and reducing direct handling that could affect the acrylic's form. This adjustment made the heating process more manageable and allowed the material to take shape more predictably.

Throughout these experiments, my reflections on the process were mixed with feelings of frustration and achievement. Each failed attempt was a lesson in persistence and innovation, pushing me to think outside the box and not shy away from unconventional methods. The experience reinforced the importance of resilience and adaptability in design. Each method brought me closer to understanding the precise needs of working with acrylic and how to manipulate it to meet the demands of my creative vision.

Despite the setbacks, this iterative process was invaluable. It not only refined my technical skills but also deepened my appreciation for the meticulous detail and patience required in material manipulation. As I continue this creative journey, I am reminded that the path to perfection is through persistent experimentation and learning from each failure, making every subsequent attempt a step closer to success.



Part 2a Acrylic part



I cut the acrylic sheets to the required dimensions on a large cutting machine in the studio. One piece, shaped like a door frame, exceeded the size limits of the laser cutter, so I had to use the CNC machine to cut the rectangular section. I hoped for a perfectly cut out rectangle, but unfortunately, all plastics are fragile. Contrary to my expectations, the frame was damaged during the CNC cutting process. Using the CNC was a risky decision, and the outcome, although disappointing, was not entirely unexpected. Therefore, I immediately needed to devise an alternative plan to acquire a new frame. The last image shows the acrylic pieces that were successfully cut and are intended for various parts of the table.



This black material is a replacement for the acrylic frame that was damaged during cutting. As I originally required a black material, this color fit perfectly. However, after cutting the acrylic, I noticed that the workshop's cutting machine produces rougher edges compared to a laser cutter. The acrylic bore visible cutting marks, which are quite unsightly upon closer inspection. This experience highlights that different cutting methods yield different results. Having used all available machines for cutting acrylic, I could clearly see the distinctions between each machine's capabilities.



Due to the 4mm thickness of this acrylic section, stability could only be achieved by using two pieces together. Therefore, I decided to join the two acrylic sheets with screws. However, given the fragile nature of acrylic, I took precautions to prevent damage. I applied tape to the areas where holes would be drilled for the screws to protect the edges. The tape also helped keep the sheets aligned and in place during the process. The screws were then securely inserted at the corners. Drilling the holes required the utmost care; I held the acrylic sheets tightly together while carefully aligning the drill with the marked spots, and then drilled swiftly and cleanly. Hesitation during this process could increase the risk of the acrylic cracking.



Part 2b Acrylic Plugin



After completing the transparent acrylic part, the next step was to make the small inserts for the cut-outs in the acrylic. When making these inserts, I recalled a problem I encountered while working on a small model: the width of the acrylic inserts, after being bent, did not match the width of the openings, preventing successful insertion. Therefore, when making the final model, I first created two test versions of the inserts with different widths. These two transparent test inserts were 2mm and 4mm narrower than I had initially planned.

This experience taught me a crucial lesson: always conduct tests beforehand.



After completing the transparent acrylic section, the next step was to create small inserts to fit into the slots I had cut into the acrylic. This reminded me of a challenge I had encountered while working on a smaller model: the width of the bent acrylic inserts did not match the slots, preventing them from fitting properly. Therefore, for the final model, I made two test versions with varying widths, each 2mm and 4mm narrower than my planned measurements.

This experience reinforced a vital lesson: always conduct preliminary tests.



After completing the transparent acrylic section, the next step was to create small inserts to fit into the slots I had cut into the acrylic. This reminded me of a challenge I had encountered while working on a smaller model: the width of the bent acrylic inserts did not match the slots, preventing them from fitting properly. Therefore, for the final model, I made two test versions with varying widths, each 2mm and 4mm narrower than my planned measurements.

This experience reinforced a vital lesson: always conduct preliminary tests.



After completing the edges, the next step was to work on the middle folding section.

The folding part was somewhat easier than the sides. I made a new observation during the heating process: the middle of the long acrylic strip tended to require less heating time compared to the edges closer to the ends. I used the same two wooden blocks I had just employed to elevate the acrylic sheet. When the middle naturally softened, I was able to bend it. Throughout this process, I was careful to ensure the edges remained aligned because if not handled attentively, they could become skewed. Eventually, this method allowed me to achieve a neatly folded acrylic panel.

Patience was crucial for this part; being too hasty could lead to unsatisfactory results. This was a key lesson from my experience.



This part relates to my earlier attempt to enable the small insert to stand supported on the acrylic. Initially, it was merely a casual experiment where I wedged a piece of wood in the middle of the insert, which unexpectedly provided stability. The rationale behind this was that the small piece of wood increased the bending angle of the acrylic. Simply by attempting to "open" the insert, I could balance it. Based on this principle, I used some offcut pieces instead of wood. I later found that a 14mm tall rectangle was too large for the opening of the insert, so I adjusted the size to 12mm. A 12mm rectangle perfectly supported the insert on the acrylic panel.

I had anticipated potential structural regrets, but to my surprise, I succeeded. The insert was securely fixed on the transparent acrylic panel, which brought me great

Part 2 Reflecting

Throughout part 2 of making a real furniture, I faced a series of challenges that required creative problem-solving and careful reflection. I initially experimented with various methods to bend and support acrylic inserts effectively. By inserting a small piece of wood, I discovered a simple yet effective way to enhance the stability of the inserts. This led me to replace the wood with acrylic offcuts, refining the dimensions to ensure a perfect fit. Despite anticipating possible structural issues, my adaptations proved successful, securing the inserts firmly on the acrylic panel.

This journey underscored the importance of persistence and adaptability in the design process. Each failed attempt and subsequent adjustment taught me valuable lessons about the properties of materials and the mechanics of structural support. My approach, combining empirical testing with theoretical adjustments, ultimately allowed me to overcome initial setbacks and achieve a satisfying outcome.

Reflecting on this experience, I've learned that innovative solutions often arise from the willingness to experiment and from a deep understanding of materials. The process has not only improved my technical skills but also enhanced my problem-solving capabilities, reinforcing the idea that every challenge in the design process is an opportunity for growth and learning.

Acrylic Part Process of Making Video

Heating the acrylic was a crucial step in the model-making process. During the creation, I recorded several key segments on video. The video captures the entire process of the acrylic being gradually heated and slowly deforming.

If the video does not play, you can find it in the files I have submitted.





Part 3 Desktop & Other Materials



The desktop is made of walnut wood, cut from a large block to the dimensions I needed. There are two parts of the table made from walnut wood: the tabletop and the sides. The connection between the two pieces of walnut is achieved using glue and screws. I first applied glue to the edges of both sides, then secured them with screws and waited for 5 hours for the glue to dry. The next step was sanding the edges. To create a rounded effect, I specifically cut another strip of walnut wood and attached it to the edges. Similarly, once the square walnut strip was firmly glued to the edge of the tabletop, it was ready to be sanded.

For the black parts of the table, I used MDF material. I had it machined at a CNC using the dimensions from the drawings.



In this step, I mounted the pink acrylic onto the MDF, utilizing the pre-cut hollow rectangular spaces under the side walnut wood. The pieces were cut to the exact dimensions specified in the drawings. However, I made some modifications by adding a strip of MDF along the edges of both acrylic panels, one side to secure the pink acrylic and the other to protect the acrylic. After completing this step, I proceeded with cleaning the acrylic. The acrylic tends to attract dust easily once the protective film is removed.



This part involves the sanding process I just mentioned. Not only do the edges of the table corners need to be sanded, but the tabletop also needs to be carefully and gently sanded using very fine sandpaper. After sanding, I applied two coats of oil to the table using a brush. This part requires patience, as it may seem simple, but it is crucial to ensure the oil is applied evenly. Uneven or excessive application can lead to colour variations later, so I was very careful while painting.













Table part: The last thing I need to do is apply black paint to the edges of the table to match the black MDF material.

Stool part: Similarly, I used acrylic material to make the stool. The black MDF on both sides was finished with CNC machining; the acrylic was cut in the laser cutting room. Finally, I glued the parts together, but I think the joints need to be redesigned because there is indeed a problem with instability when sitting on it.

Part 3 Reflecting

The entire process of creating the model has successfully concluded. Although there are some imperfections, such as the bending of the acrylic and the stability of the chair, for my first full-size model, the results have been highly satisfying. This project went smoothly with hardly any setbacks or regrets. Crafting this table by hand was a fresh experience that was extremely rewarding. Apart from the wood and acrylic that I didn't produce, I completed almost everything myself. My mentor Paul gave me invaluable advice, and Ben taught me many crafting skills. Having such great teachers, combined with my proactive approach to learning, made the process much easier.

Only I know the effort I put in over the last month and a half. I arrived at school by 9 AM every day, waiting for the workshop to open, worked on the model until 5 PM, and then went home. Although getting up early was hard, the workshop wasn't crowded in the morning, allowing me to make significant progress quietly.

I've come to realize that woodworking is not easy, but diligence helps. Just like learning Rhino and Keyshot was painful, continuous practice and use made me more skilled. Like sanding wood, beginners often struggle with precision. However, with more practice and persistence, I believe I will become proficient in making full-size furniture in the future.

Full Size Model Show





The mini one and the full-size one



















The photography process had some pities because I couldn't book the school's photo studio. Additionally, my model is quite large and not easy to move around; I am concerned about potential damage during transportation. Therefore, I am still trying to take better photos.
Tools I used

Through all the design process



► The software I used throughout the work



The website I used throughout the work

Reflective Writing on my Final Project

Working on my final project, "MeowMate," has been an immensely rewarding and enlightening experience. Initially inspired by my love for cats and my desire to create something that bridges the gap between humans and their pets, this project has taken me on a journey of extensive research, hands-on experimentation, and continuous learning.

The process began with a clear and detailed plan, which proved crucial in managing my time and resources effectively. My research phase was comprehensive, including data collection, surveys, interviews, and case studies. Through these methods, I gathered valuable insights into the behaviours and preferences of cats, as well as the needs and expectations of their owners. This foundation helped me shape a design that is both practical and innovative.

One of the most challenging and exciting aspects was experimenting with acrylic bending. Despite initial scepticism, I discovered various methods to heat and bend acrylic, such as using a gas stove, hot air gun, soldering gun, and induction cooker. Each method required patience and precision, but the results were gratifying. This hands-on experience taught me the importance of testing and prototyping, reinforcing the lesson that practical experimentation is indispensable in design.

The creation of the full-size model was another significant milestone. While there were challenges, such as ensuring the stability of the chair and achieving the desired curves in the acrylic, the process was immensely satisfying. The use of different materials, like walnut wood for the tabletop and MDF for the structural components, required careful consideration and execution. The step-by-step process of cutting, assembling, and finishing the pieces was both meticulous and fulfilling.

Throughout the project, the guidance and support of my mentors, Paul and Ben, were invaluable. Their advice and expertise not only enhanced my technical skills but also broadened my perspective on design. The iterative process of designing, testing, and refining my work underscored the importance of flexibility and adaptability in achieving the best results.

In addition to technical skills, this project has deepened my understanding of the emotional and psychological aspects of design. The survey results revealed the complex emotional profiles of cats and their varied interactions with humans. These insights informed my design choices, ensuring that the final product would enhance the bond between pets and their owners while accommodating their respective needs.

Reflecting on this journey, I am proud of what I have achieved. The project has not only honed my design and fabrication skills but also enriched my understanding of user-centered design. Moving forward, I am excited to apply these lessons to future projects, always striving to create products that are both functional and meaningful.

Achievements

Innovative Design Concept: I successfully cantered your design around human-cat interaction, introducing the concept of "MeowMate." This design not only addresses human needs but also considers cat behaviours, truly embodying user-centered design principles.

Extensive and In-depth Research: I conducted extensive research, including literature reviews, surveys, interviews, and case studies. Through these efforts, I gathered substantial first-hand data on cat behaviours and owner needs, providing a solid foundation for your design.

Bold Experimentation with Materials and Techniques: Throughout the production process, I experimented with various materials and techniques, particularly in bending and joining acrylic. This not only showcased your practical skills but also reflected your technical innovation and breakthroughs.

Full-size Model Production: I successfully created a full-size model of the desk and chair, personally overseeing every step from design to production. My use of walnut wood and MDF, along with meticulous attention to detail, demonstrated my professional skills and dedication to craftsmanship.

Deep Focus on User Experience: My design consistently aimed to enhance user experience, from detailed craftsmanship to functional design, reflecting your deep understanding and prioritization of user needs.

Considerations of ergonomics in the desk and chair design ensured high standards of practicality and comfort.

Effective Use of Team Collaboration and Mentor Guidance: Throughout the project, I fully utilized feedback from mentors and peers to continually improve your design. This open attitude and team spirit contributed to a more refined and professional design process.

Pities

Time and Resource Constraints: Due to limitations in time and resources, some design details did not meet expectations. Issues such as the stability of the chair and the precision of acrylic bending affected the perfection of the final product to some extent.

Constraints in Photography Equipment and Venue: During the project presentation phase, the inability to book an ideal photo studio led to compromises in the shooting conditions. This impacted the display effect, preventing the best presentation of your design.

Room for Improvement in Connection Parts: Despite multiple attempts at joining acrylic and wood, some connections still have room for improvement. More stable and aesthetically pleasing connection methods could enhance the overall quality and user experience of the design.

Unrealized Design Improvements: Due to time constraints, some planned design improvements were not realized. Further optimization of acrylic bending precision and chair structure are areas for future enhancement.

Community contribution

In my product design process, I consistently focus on the real needs of the community, striving to make a positive contribution through my designs. I conducted surveys, questionnaires, and user interviews to deeply understand the needs and expectations of different groups within the community. For example, through conversations with cat owners in the community, I discovered that many cat owners want to take care of their pets while working, which led to the concept of "MeowMate." Based on the research results, I proposed the "MeowMate" desk and chair design, aiming to provide cat owners with a workspace that they can share with their pets. My design considers not only the user experience of humans but also the comfort and safety of pets.

During the design process, I invited several cat owners to participate in user testing, collecting their experiences and feedback. Based on their feedback, I made multiple improvements and optimizations to ensure the product truly meets the users' needs. I developed a detailed implementation plan to ensure the product design can be successfully realized. Through community events, promotional materials, and social media channels, I actively promoted the "MeowMate" design, hoping to benefit more cat owners. After the product is put into use, I will continuously track community feedback to promptly identify and resolve issues. Based on actual usage, I will continually iterate and upgrade the product to ensure it meets community needs over the long term.

Special Thanks

I would like to thank Paul for his constant encouragement and recognition of my progress, no matter how small. As my mentor, he consistently provided professional advice, respected my ideas, and guided me when I was most confused during the initial stages of my design.

I also want to thank Ben from the workshop. When I was creating the full-size model, he patiently taught a beginner like me how to proceed. He provided the most efficient solutions for my imperfect plans, helping me avoid many issues during the model-making process.

Additionally, I want to express my gratitude to the friends and strangers who participated in my surveys and interviews. Their valuable feedback enabled the research portion of my project to achieve a satisfying result.

Finally, I want to thank myself. Thank you for persevering and completing this project.

Record of Final Assignment Submission





Happy End





May this design bring more moments of companionship and joy with our pets