

# Natural Origami

15 Animal Models for  
the Expert Folder



Joseph Hwang

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# Introduction

What attracts me to the  $22.5^\circ$  style of design in origami is the aesthetic beauty of simplicity. Unlike many new pieces today, these designs are created not with the intention of adding more to impress, but rather with the understanding that great beauty can be found in the most basic geometric forms. While simple in visual appearance, these pieces can be surprisingly technical in structure and detail. Lines, creases and angles are arranged in a display of geometric complexity, forming abstract representations of the subjects.

From the traditional crane to the traditional frog, early origami models in Japan adopted basic  $22.5^\circ$  design features. As origami progressed, new techniques such as boxpleating and circle packing emerged. Many origami artists began developing more diverse and complex structures using these innovative techniques, often combining several styles in a single model. Traditional  $22.5^\circ$  design progressed through the works of early designers like Kunihiko Kasahara, followed by Jun Maekawa. Gradually, models began following a stricter set of rules: starting only from squares, and requiring nearly all folds in the collapsed base to be a multiple of  $22.5^\circ$ . In the 1990s through the 2000s, this style of design reached its highest standards to date in the models of Hideo Komatsu. Komatsu introduced a superior level of complexity, quality, and proportions to his strictly  $22.5^\circ$  compositions than that of any previous pieces. His models established a new benchmark that still holds to the present. Today,  $22.5^\circ$  design lives on in the work of a new generation of brilliant, young designers such as Kaede Nakamura and Jaeil Jeong. These designers continue to push the boundaries of this beautiful and unique style of folding.

Fascinated with this style and approach to origami design, I have spent the past two years designing a series of animal models loosely based on the zodiac. In this book, I would like to share those pieces with the origami community.



# Condensed Diagramming

Since beginning this series, I have had an ambition to publish my designs in a book. However, the thought of devoting significant time and effort to produce traditional diagrams has always hindered any progress. It was only until I devised a new efficient method of diagramming, that I have decided to make this book a reality. I call this new method condensed diagramming. Unlike traditional diagramming, which breaks down each folding movement into one or more individual steps, condensed diagramming groups several steps together without compromising too much information. It is best described as a fusion between a crease pattern and a set of diagrams. As such, it is targeted towards experienced folders who are familiar with crease patterns.

In each new precreasing step, previous precreases are grayed out, while new precreases are bolded. All references are contained within the creases. In the collapsing steps, mountain and valley folds are represented by blue and red lines respectively; the collapsed base is supplemented underneath. Lastly, shaping is presented as a general guideline, allowing subjective interpretation of the piece.

The diagrams may not be easy for the inexperienced folder. Treat them as puzzles, and take time to decode and understand them. At the completion of the models, you may find that you have obtained a better understanding of the designs than if you had folded them from traditional diagrams.

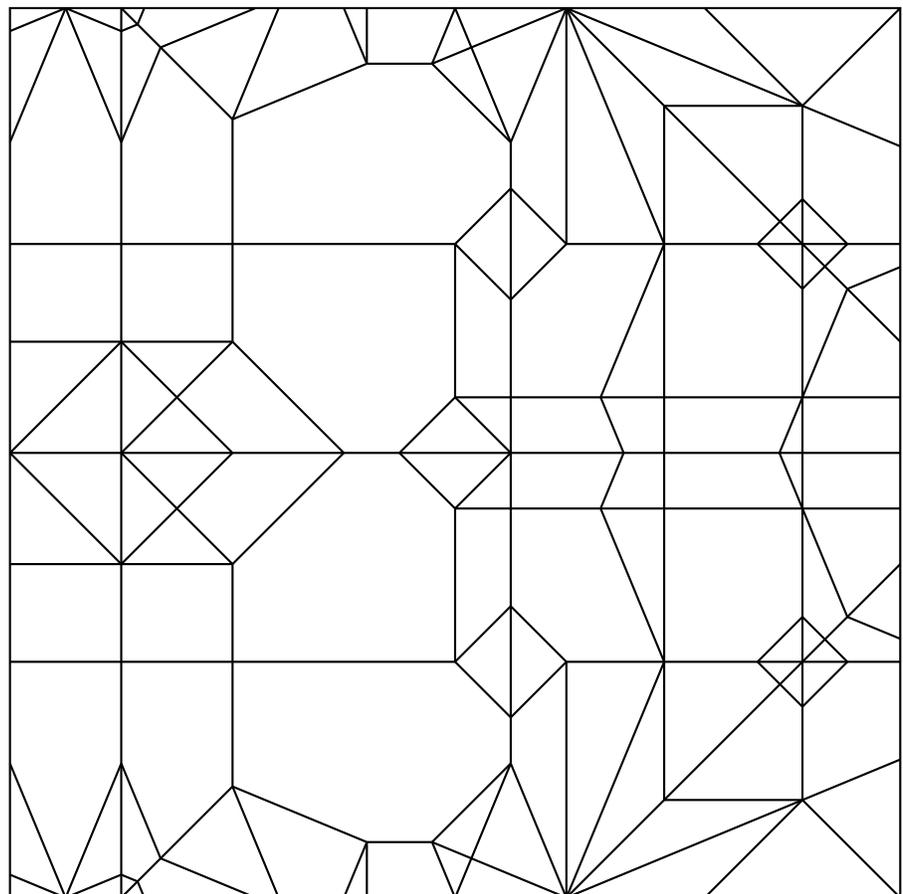
# Pig

2018

Golden River Leather Paper

6.5 in × 4 in × 1.5 in

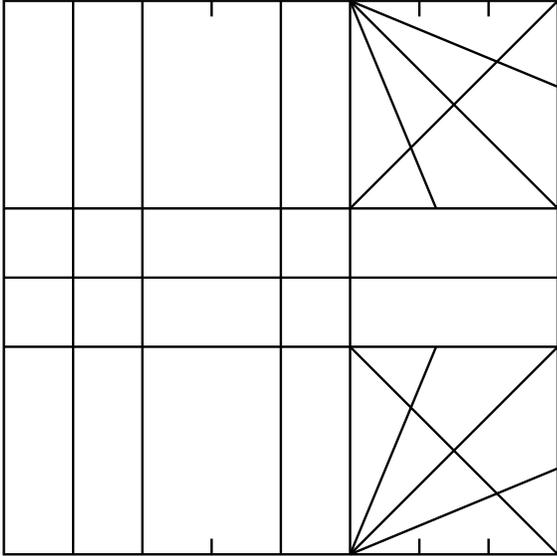
One of the first pieces I designed in this series, the pig is a rare example of a model that beautifully merges  $22.5^\circ$  design with an  $8 \times 8$  grid. The distribution of paper flows naturally through the model forming a hierarchy of layers. The design is full of subtle details from the emphasis of fat in the belly and neck areas to the pointiness of the limbs under the body. Careful observation will reveal the underlying symmetries hidden within the  $22.5^\circ$  angles. As a result, this model will remain one of my most successful and favorite models.



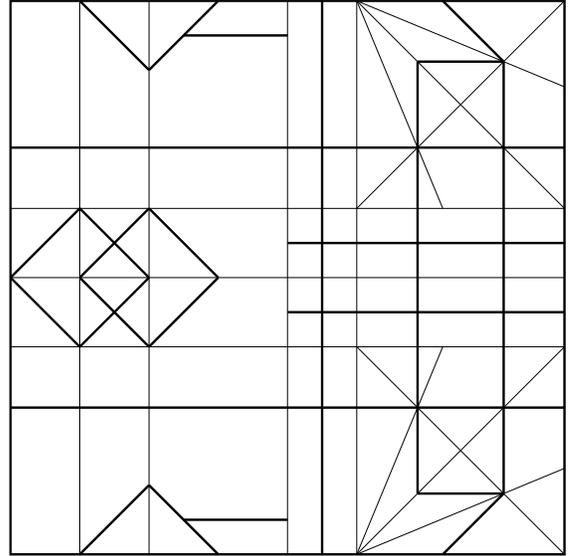


# Precrease

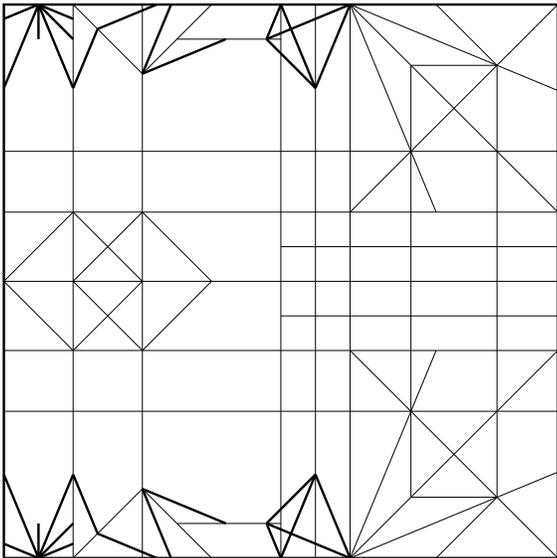
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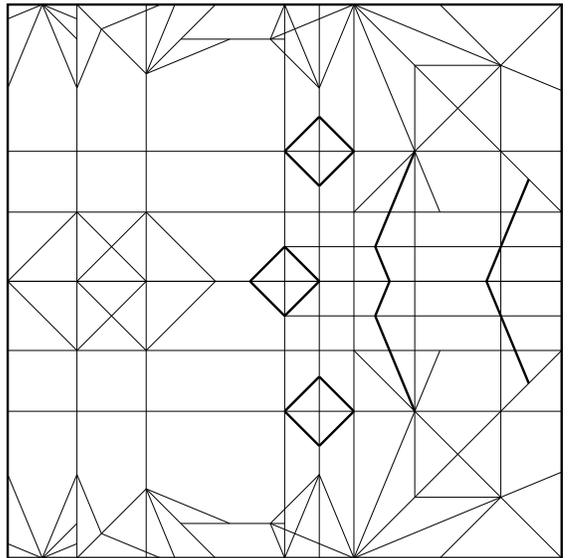
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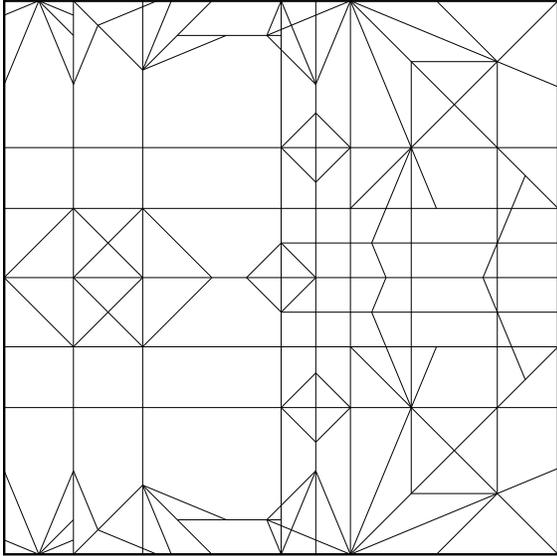
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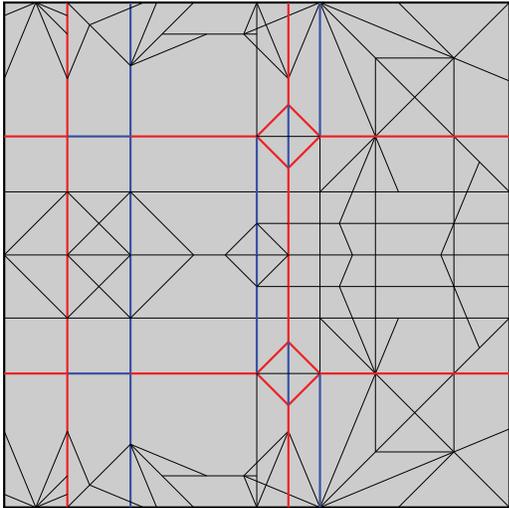


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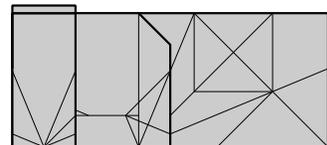
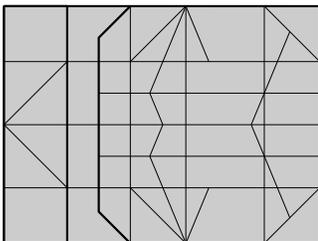
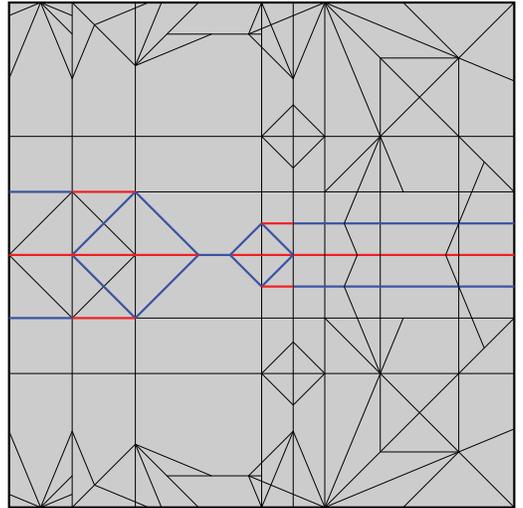


### Collapse

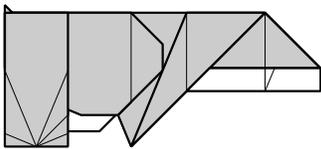
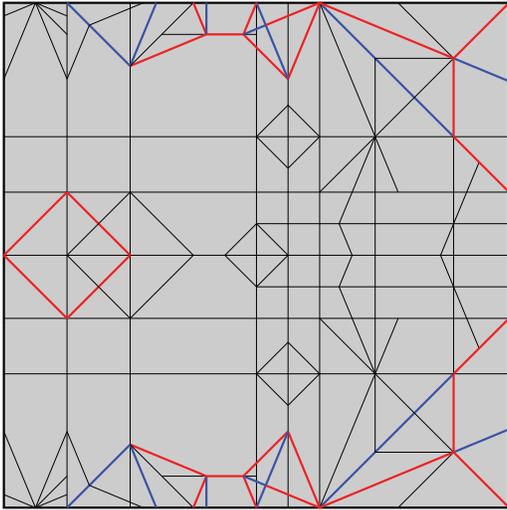
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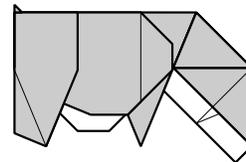
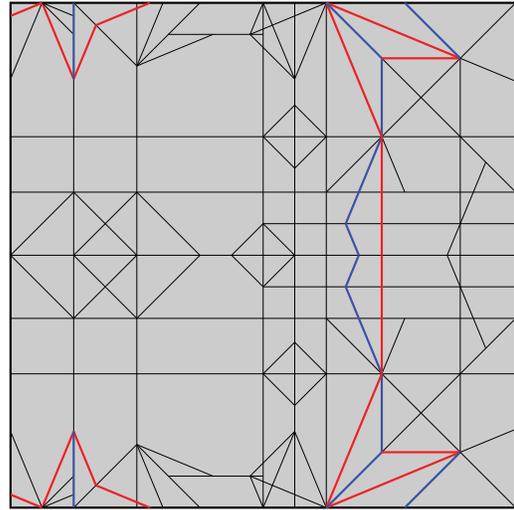
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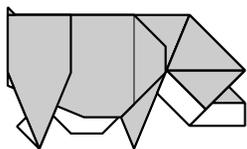
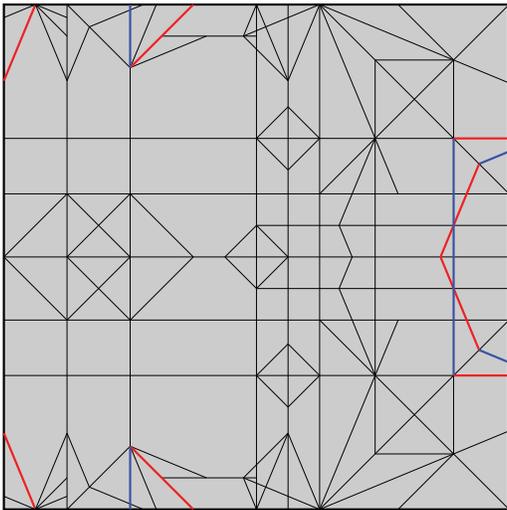
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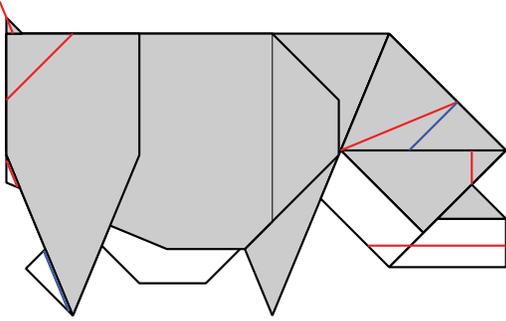


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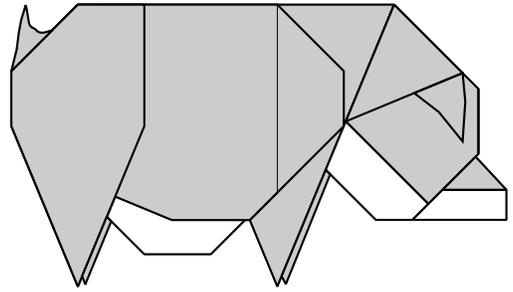


## Shaping

1



2



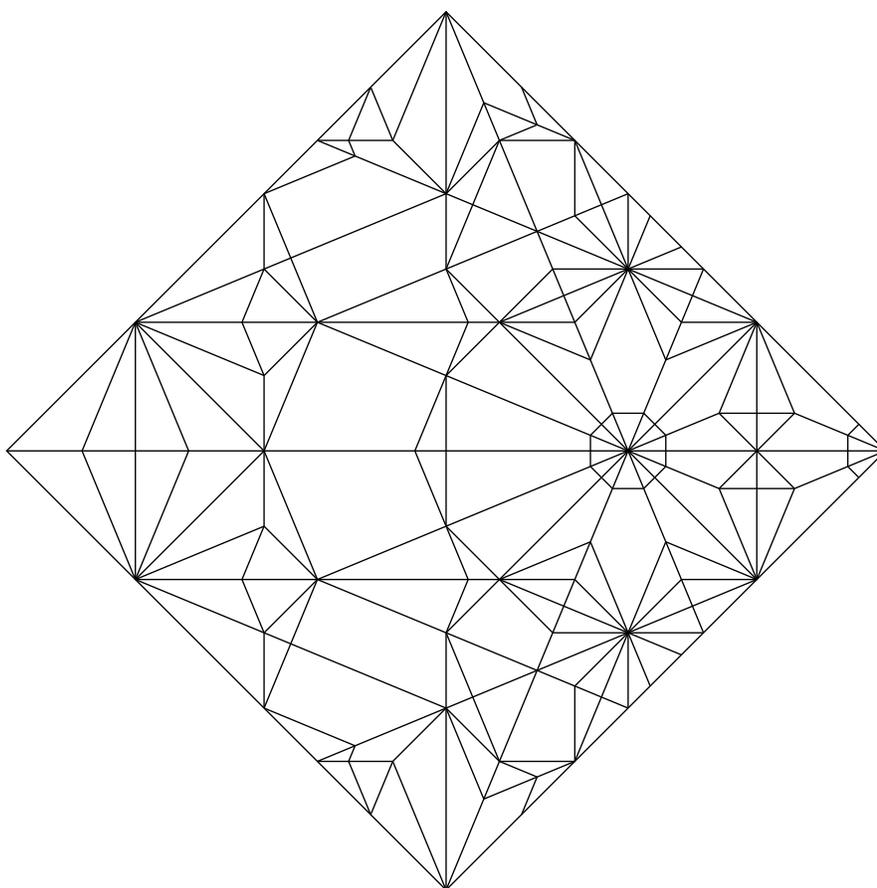
# Goat

2019

Ingres Paper

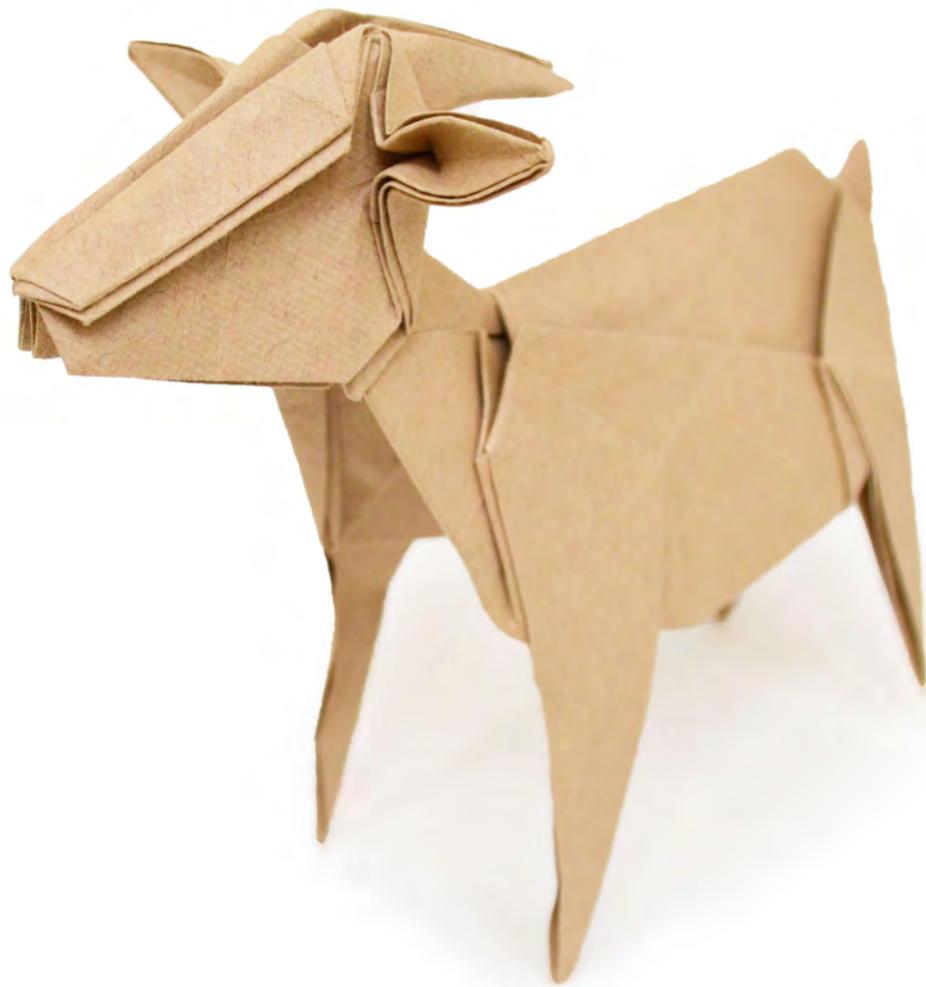
7 in × 7 in × 3.5 in

The beauty of this piece begins in the intentional symmetry of the legs, creating a distinct section that is divided by a diagonal line running towards the head. The valley folds on the head form an abstract and simplistic interpretation of the face, while the horns and ears add the distinctive characteristics of a goat. The finished design is easily identifiable, yet retains a simple stylistic nature.



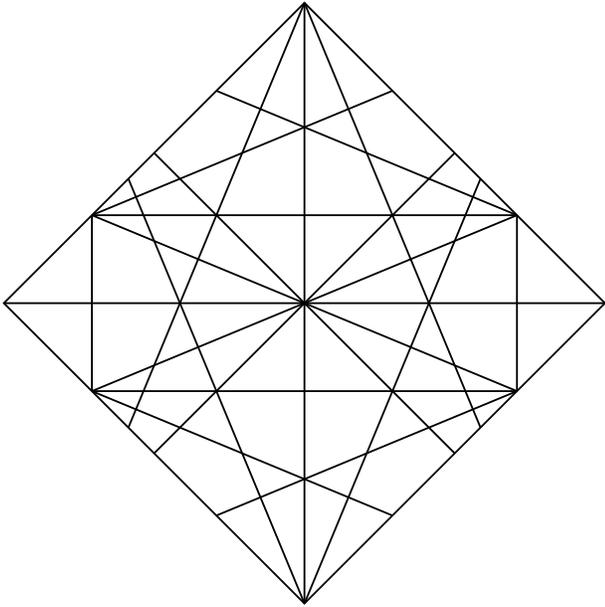




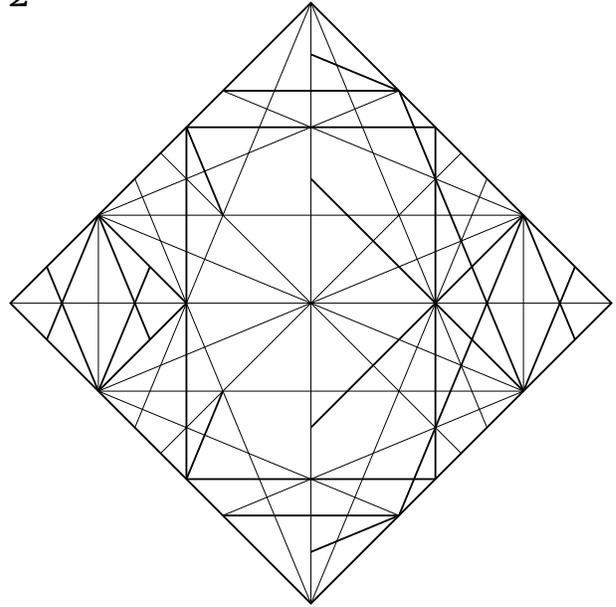


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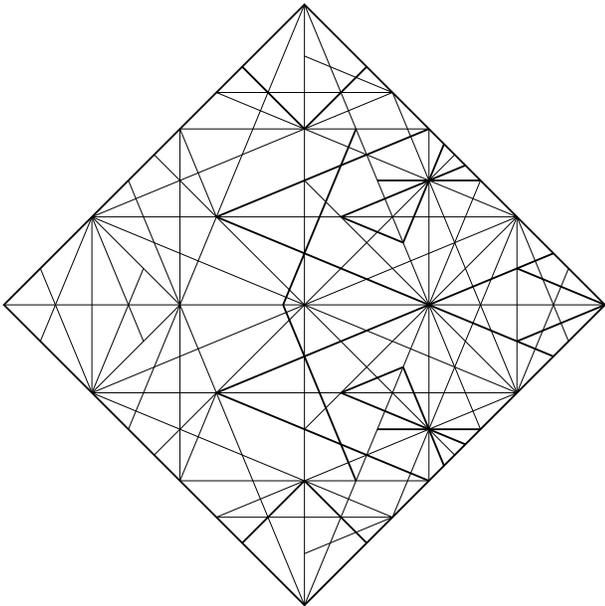
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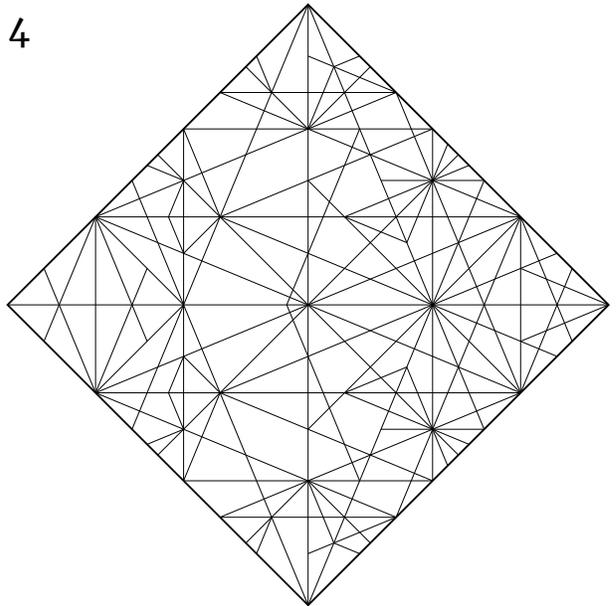
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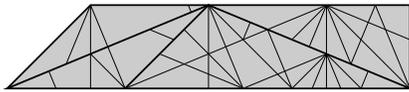
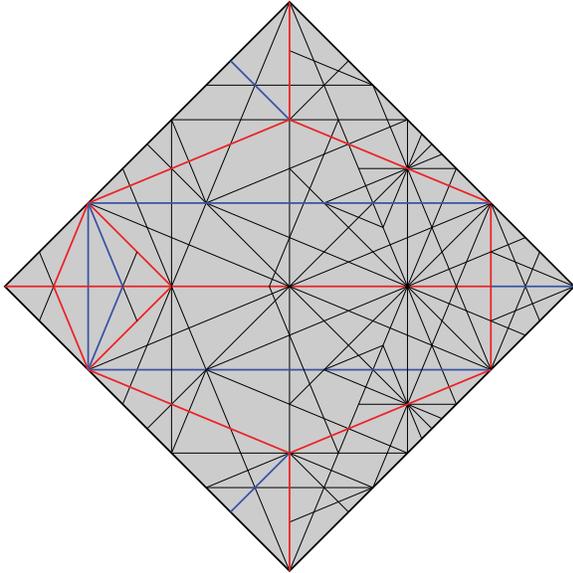


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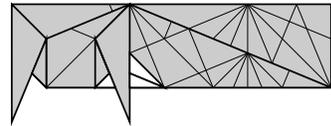
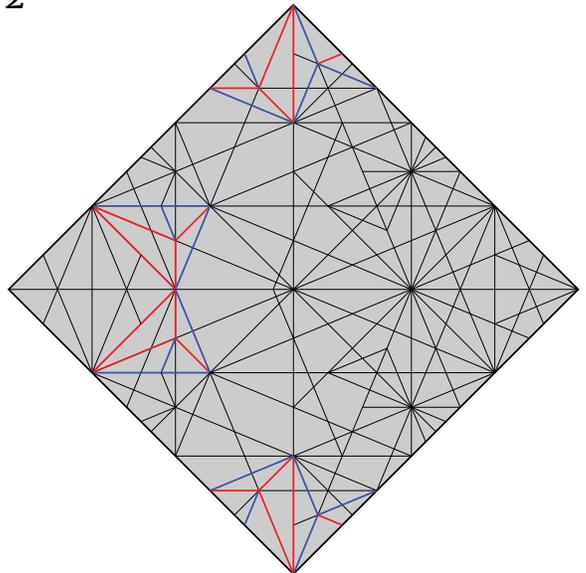


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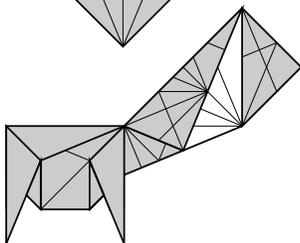
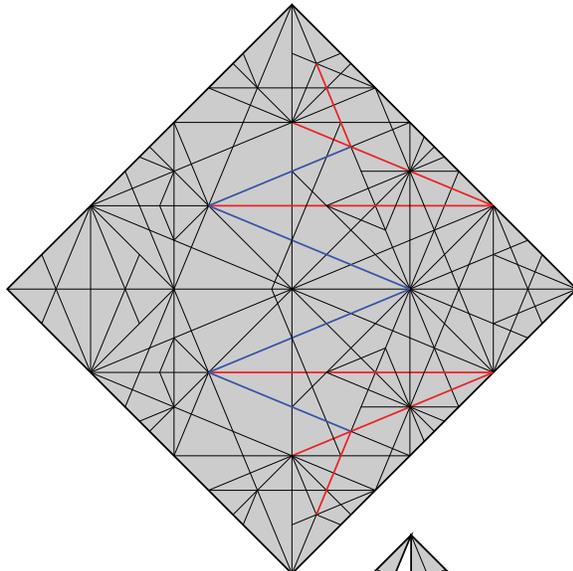
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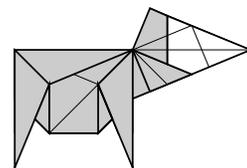
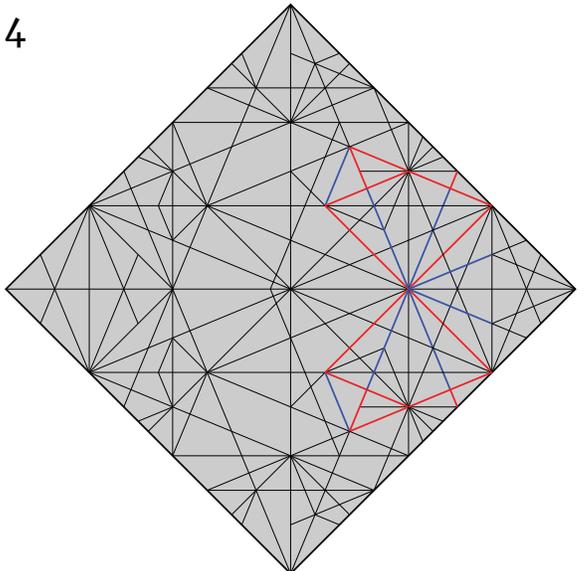
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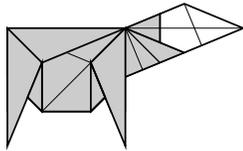
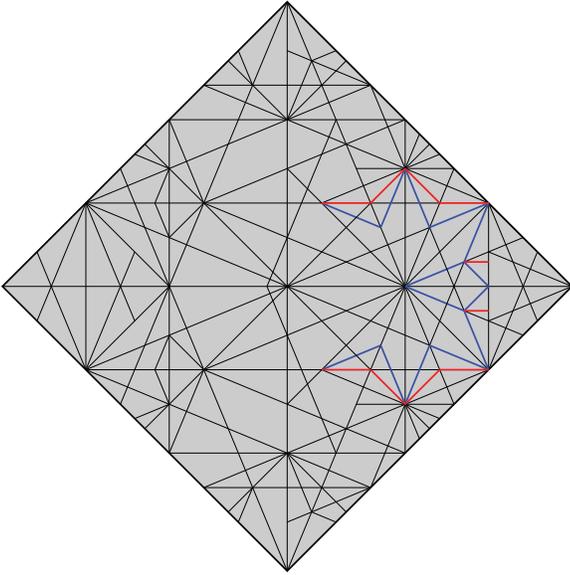
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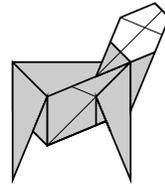
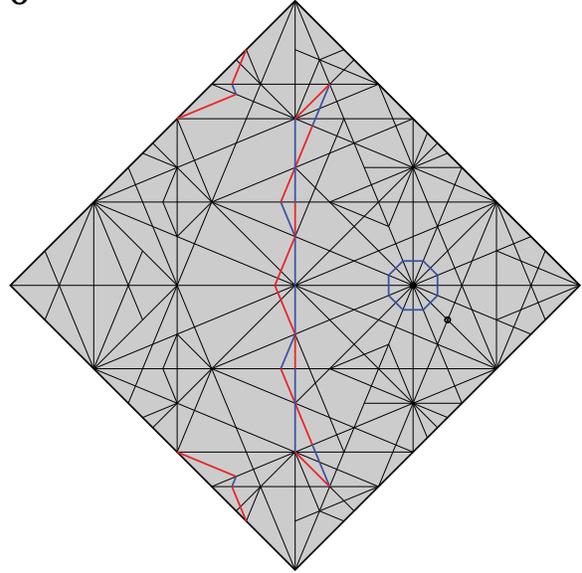
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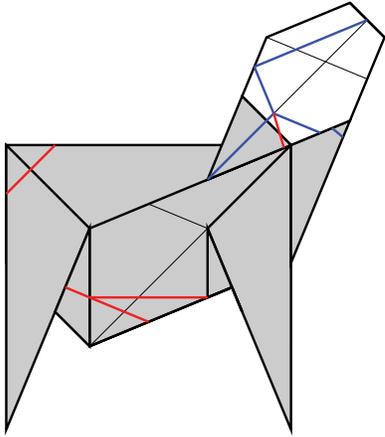


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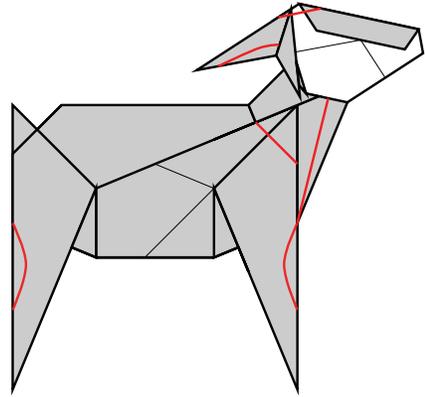


## Shaping

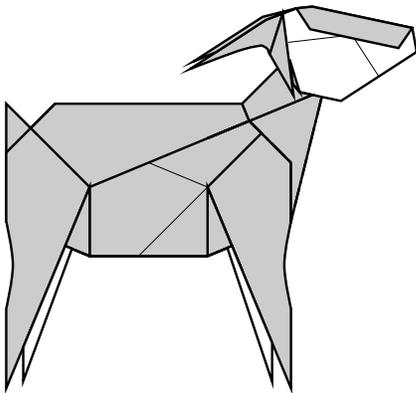
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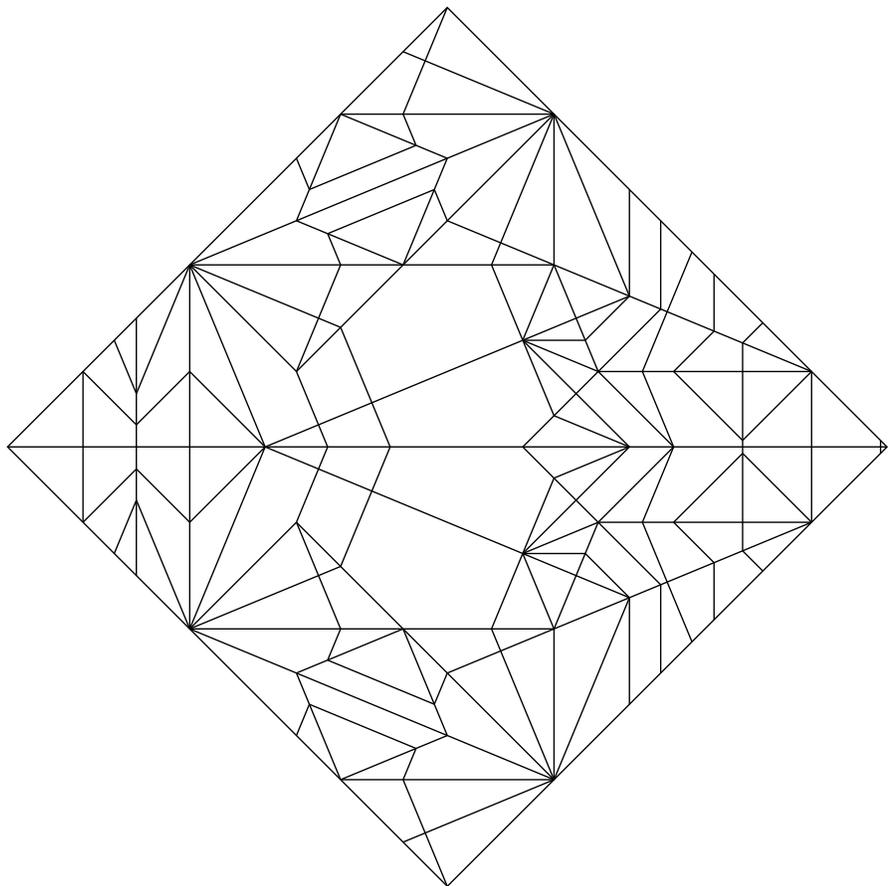
# Sheep

2019

Ingres & Unryu Paper

7.5 in × 5.5 in × 3 in

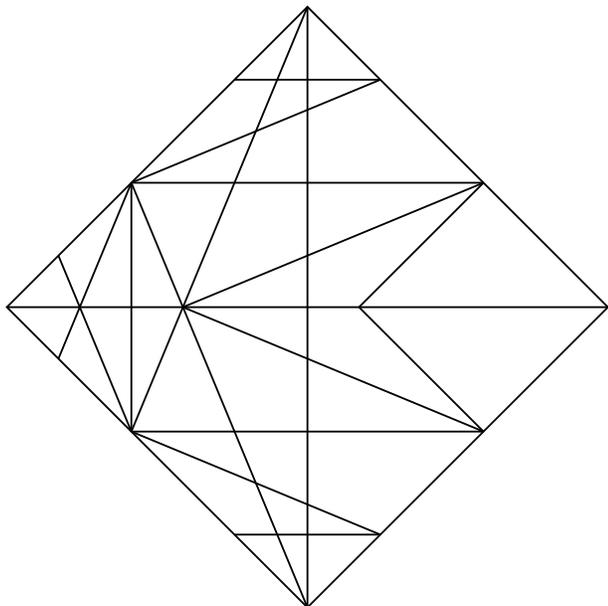
The sheep is an excellent blend of 22.5° design and color change technique. The base features a similar concept as the one found in the cow in which the main body faces are split from the axis at 22.5° angles to distribute paper towards the front. An important objective during the design process was to imitate the natural appearance of the body and wool. This was achieved by using internal lines to mark the distinction of the limbs and carefully using the color change to portray the wool.



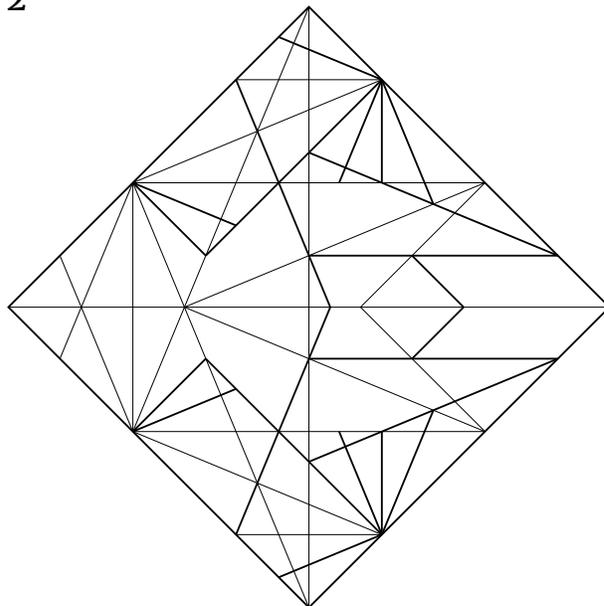


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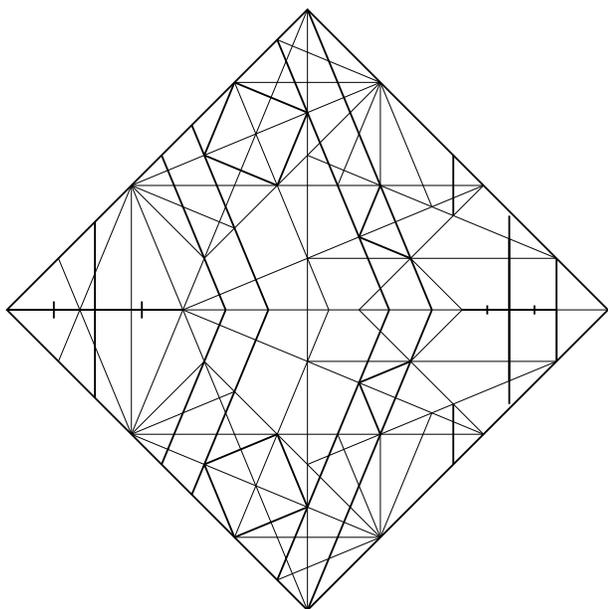
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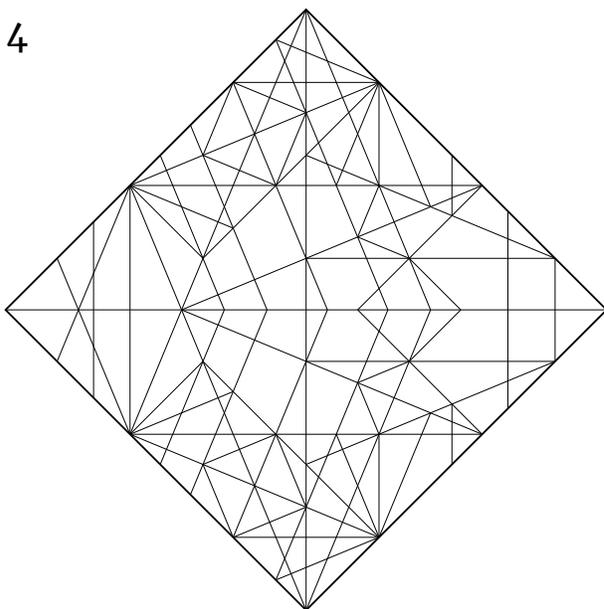
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3

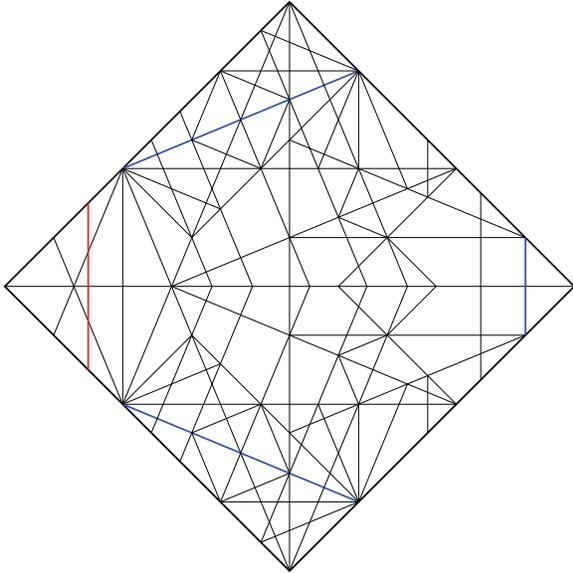


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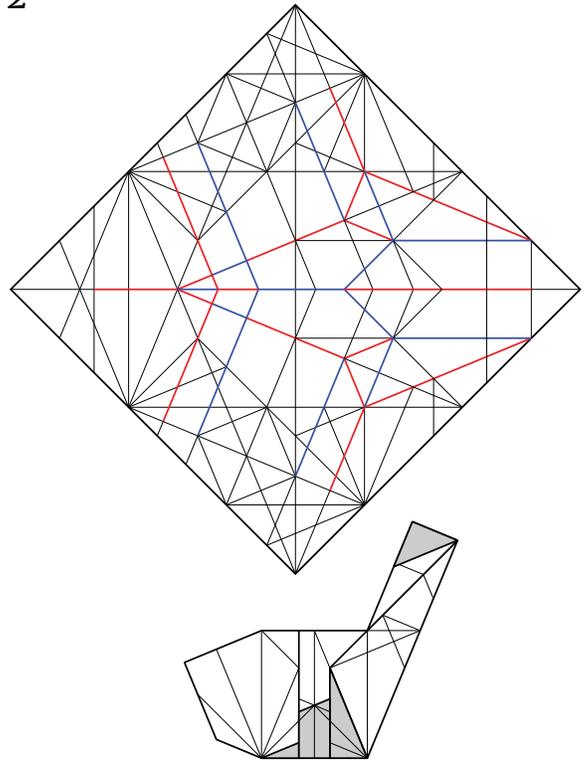


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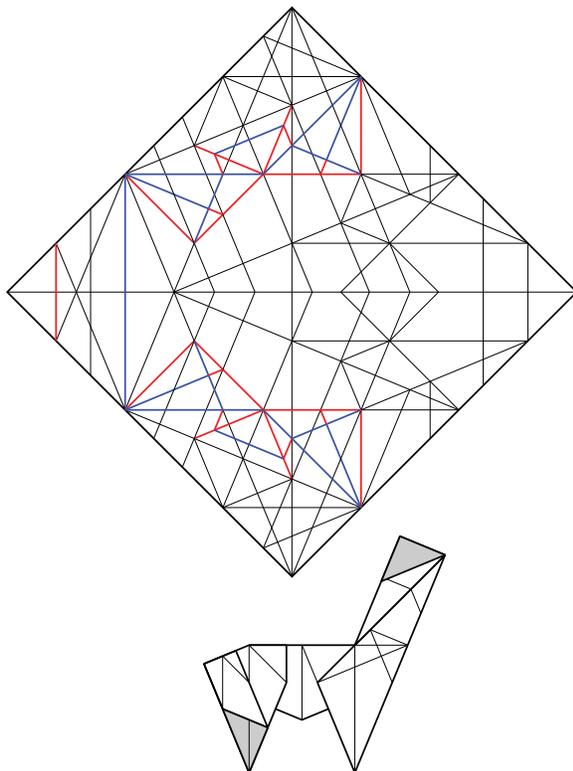
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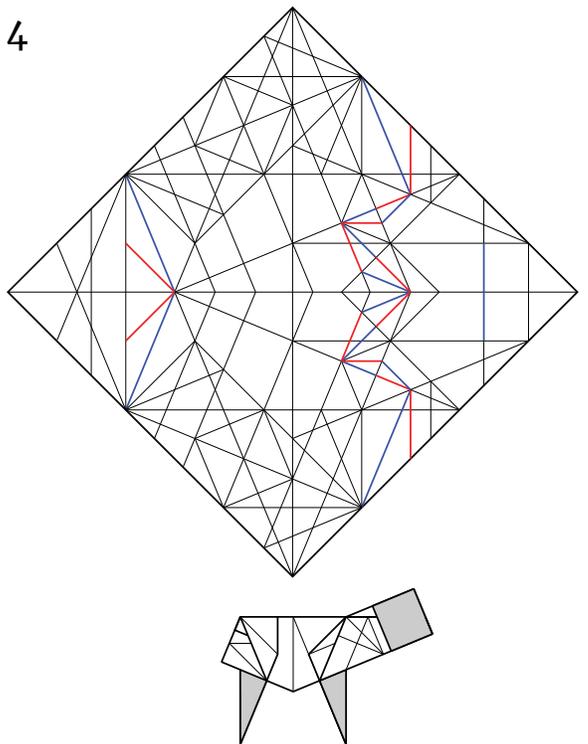
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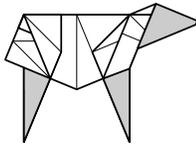
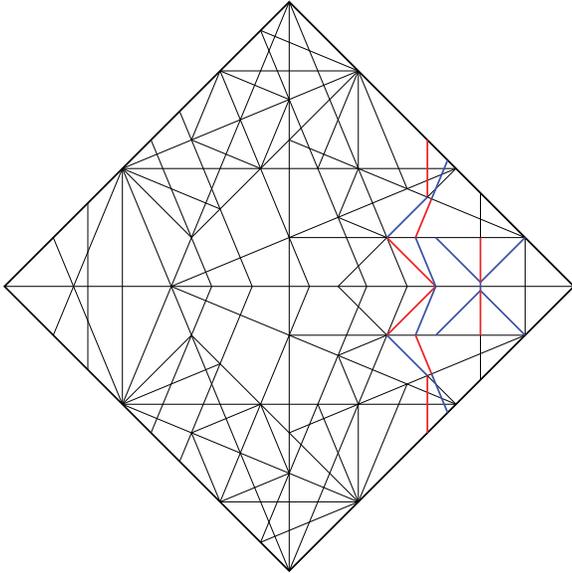
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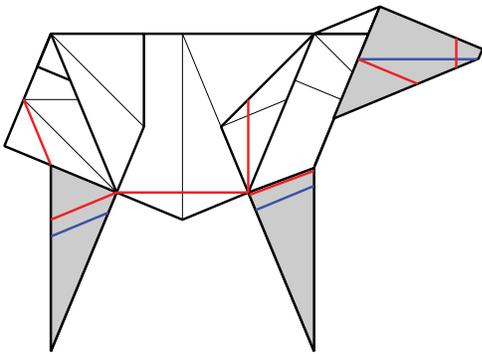


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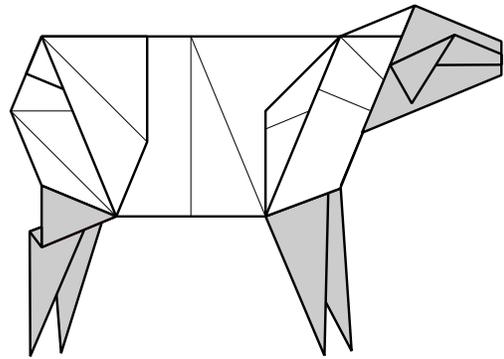


### Shaping

1



2

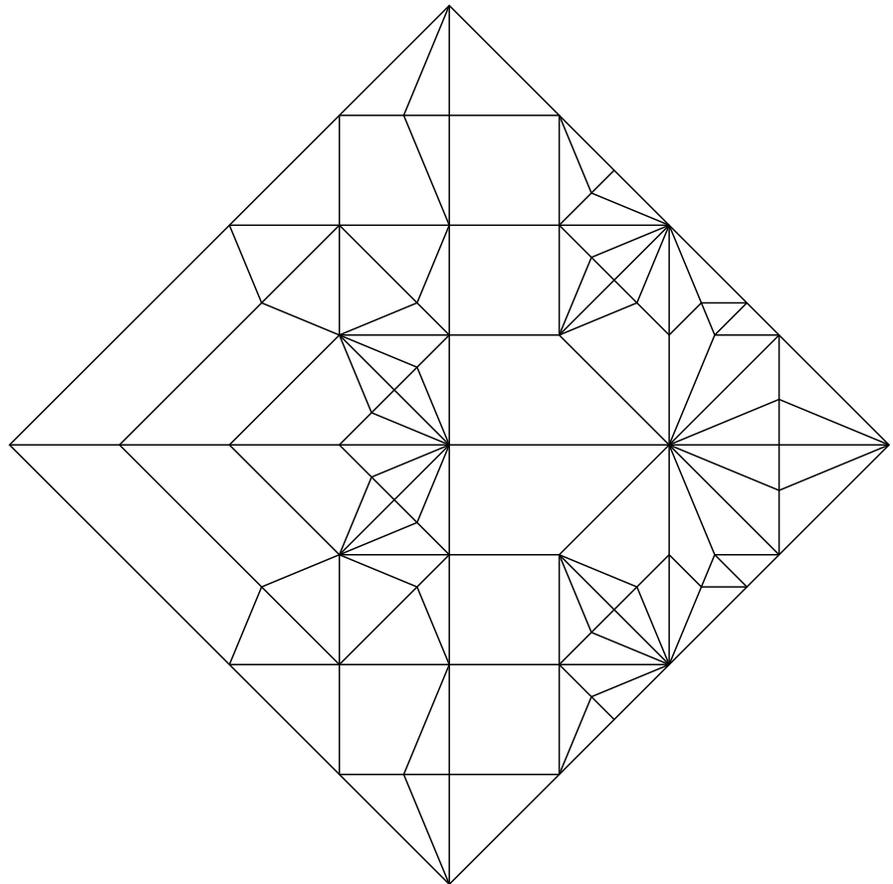


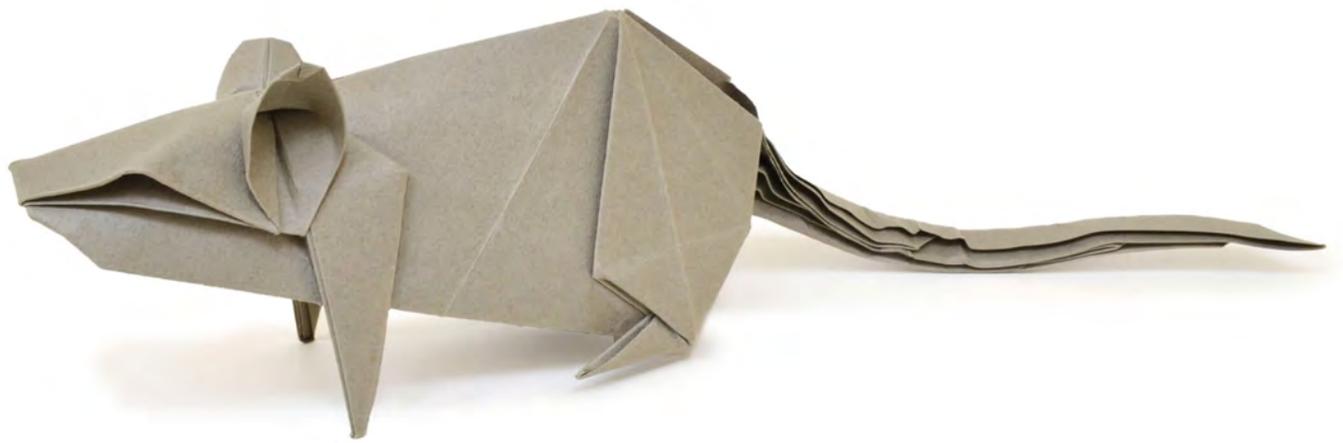


# Rat

2020  
Paper  
11 in × 3 in × 3 in

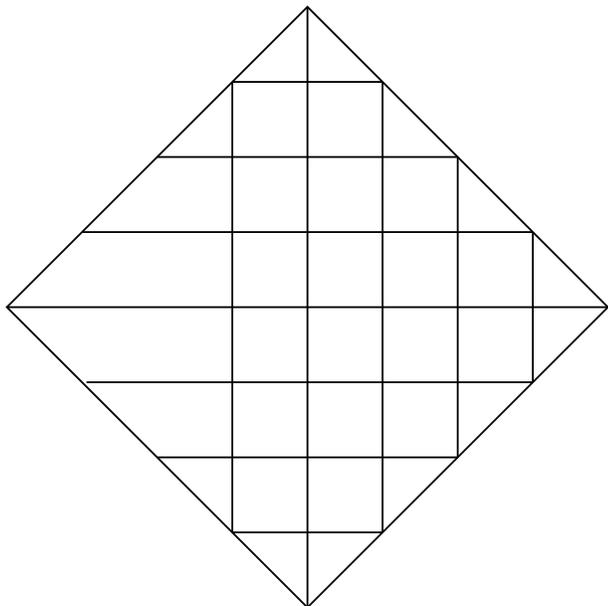
Designed on the year of the rat, this model attempts to capture the form of a rat as realistically as possible, while maintaining a degree of abstract minimalism. The design required numerous iterations to get the proportions right. I settled on an 8 x 8 grid which gave me enough paper to form each body part accurately.



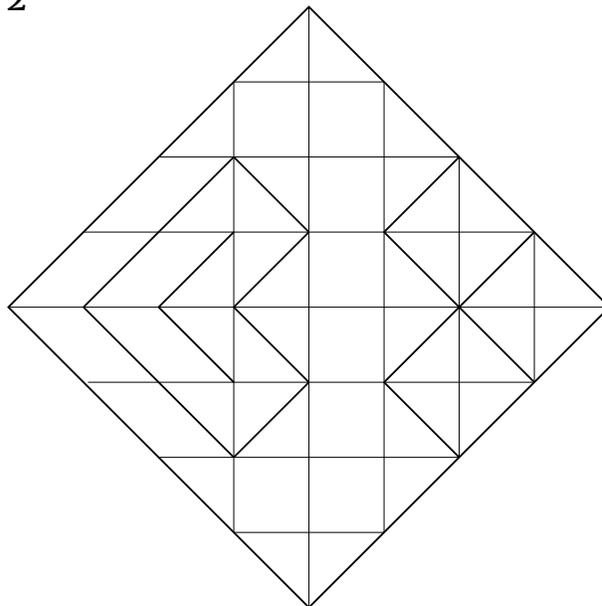


## Precrease

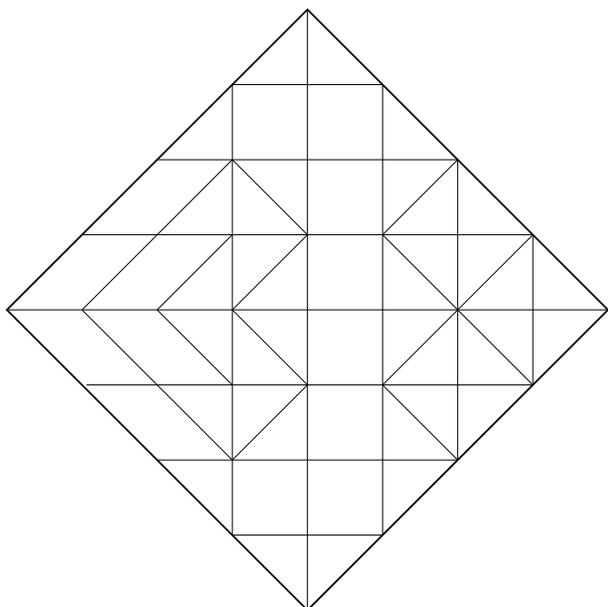
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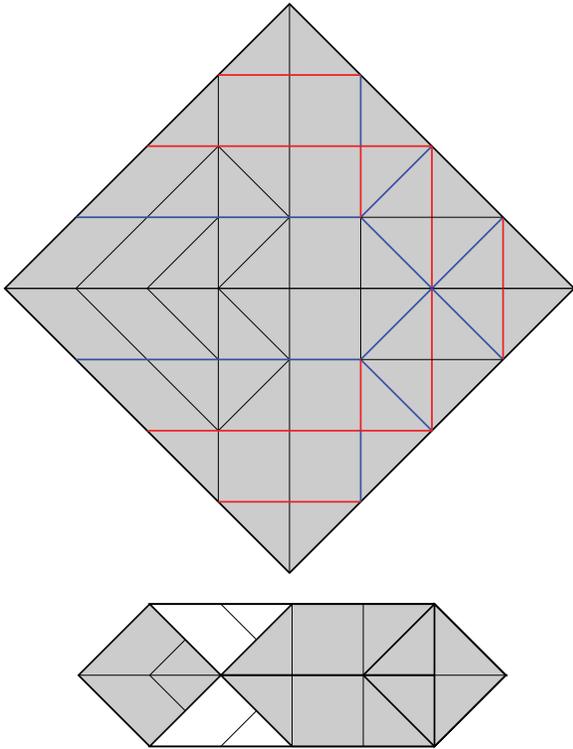


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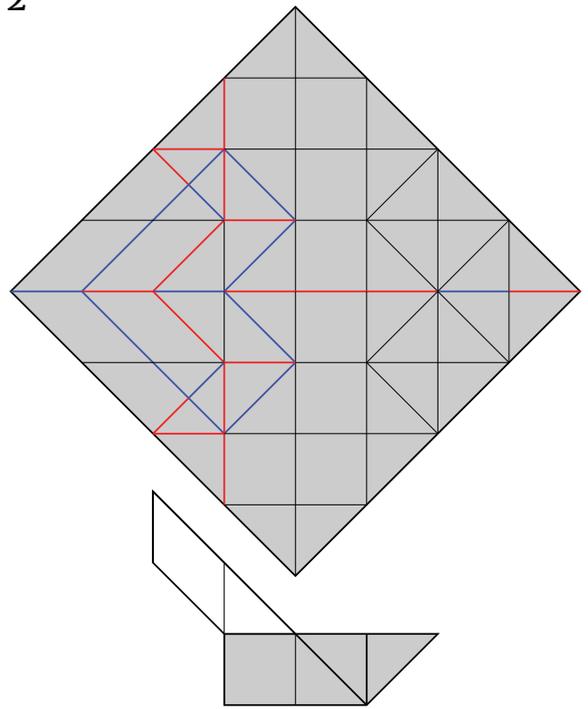


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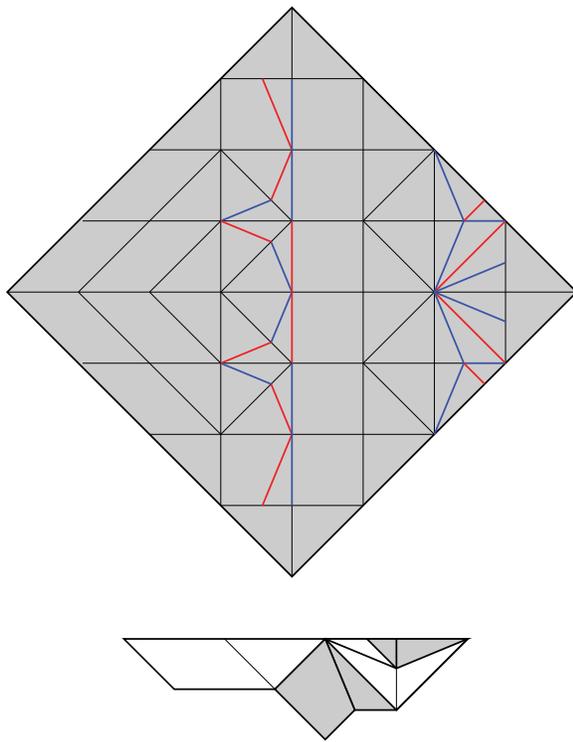
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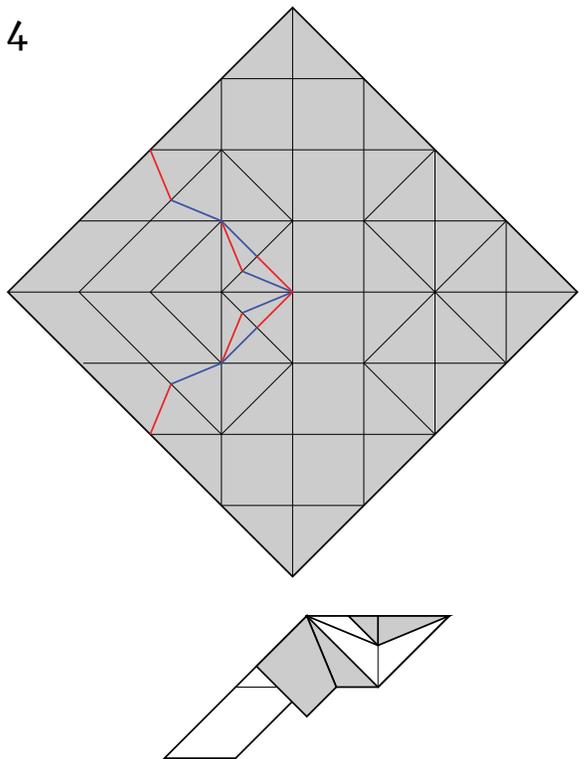
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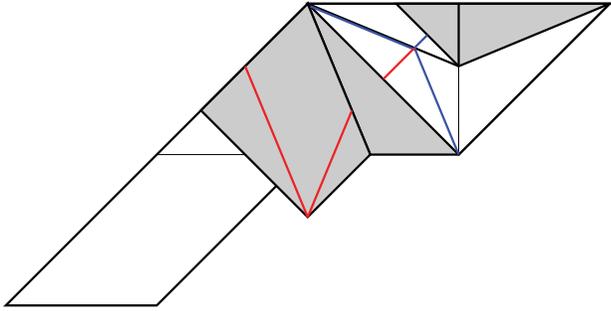


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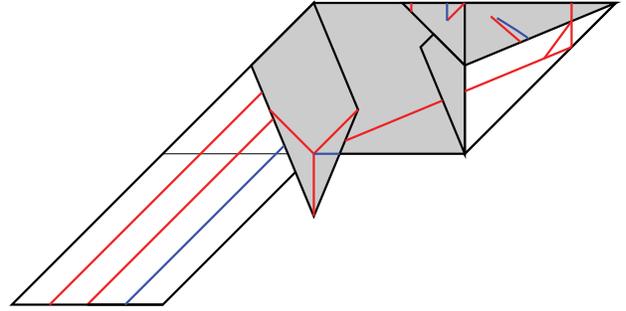


# Shaping

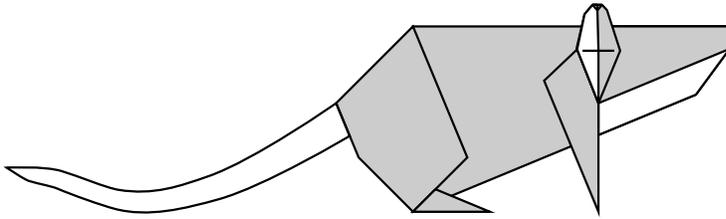
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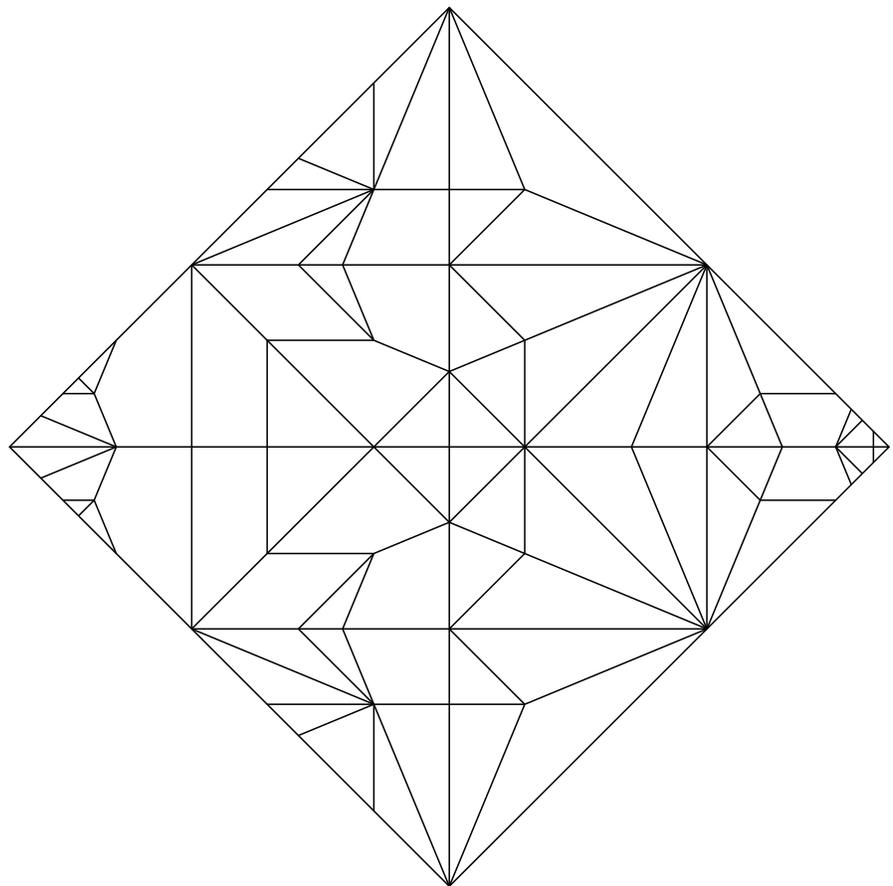
# Rabbit

2019

Ingres Paper

5.5 in × 9 in × 2 in

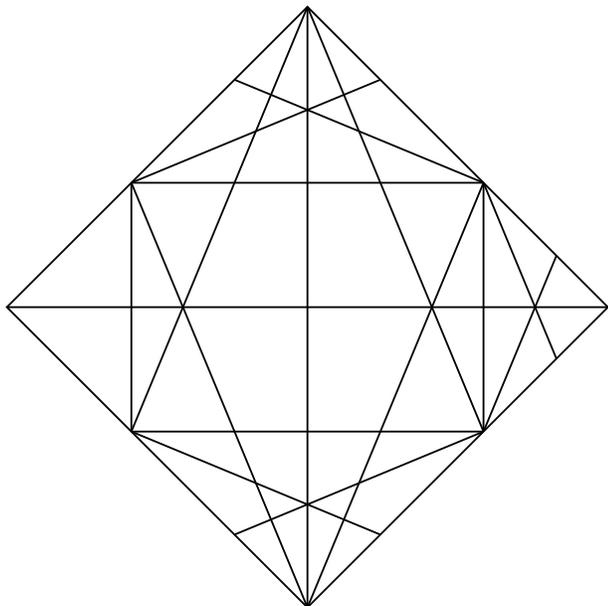
I decided to model my rabbit design on a wild hare. The hare's long legs and tall stance allow it to have great speed and visibility as a wild prey animal. With this in mind, I organized the lines and creases to reflect this specific pose. The long lines forming the front legs extend from a point in the back, the back legs are positioned lower, and the feet are folded using simple mountain folds. The internal lines are framed within parallel 45° lines that angle the body in an alert and ready pose.



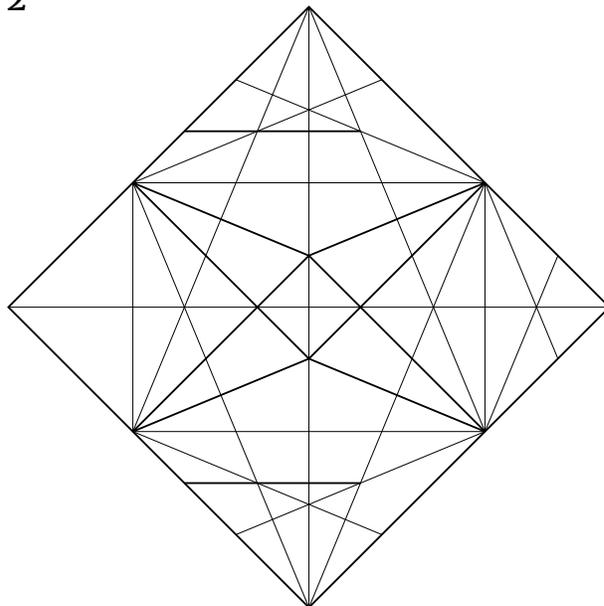


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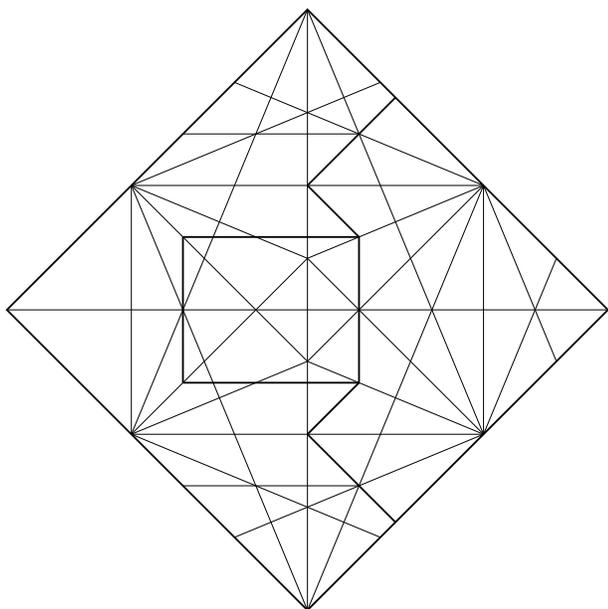
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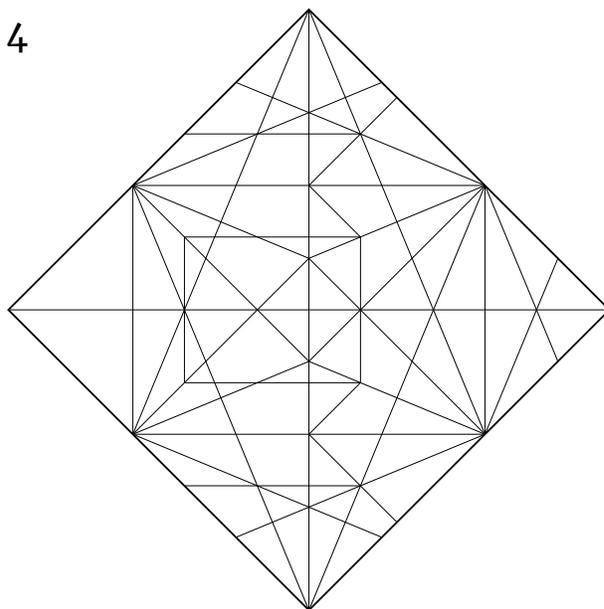
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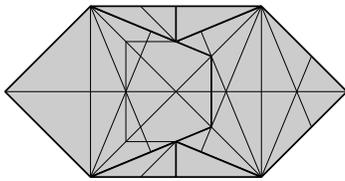
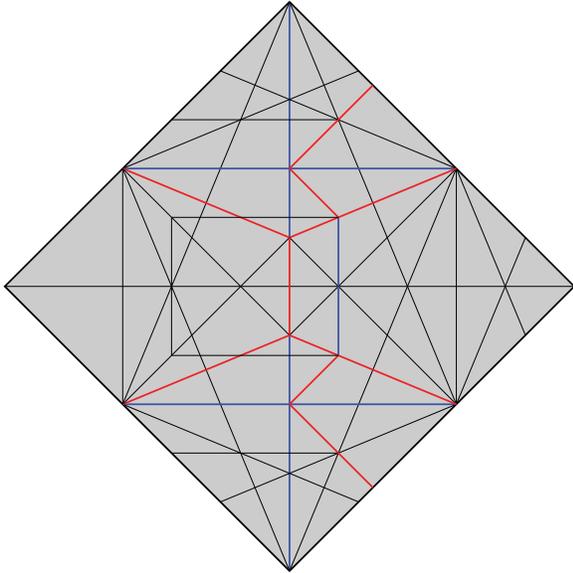


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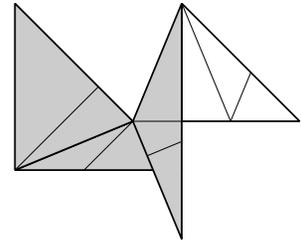
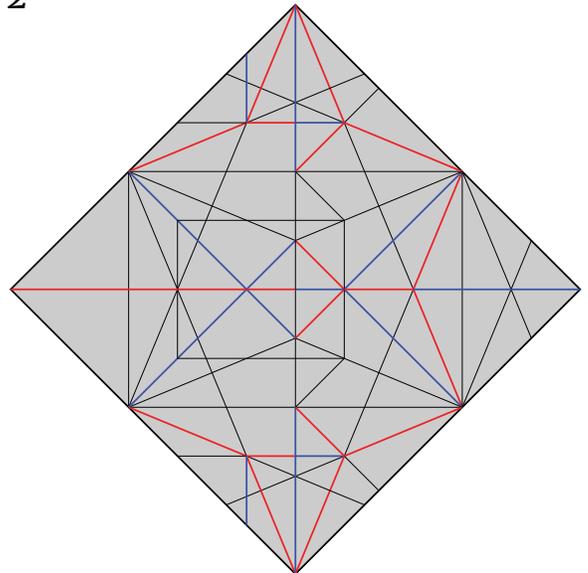


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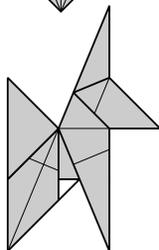
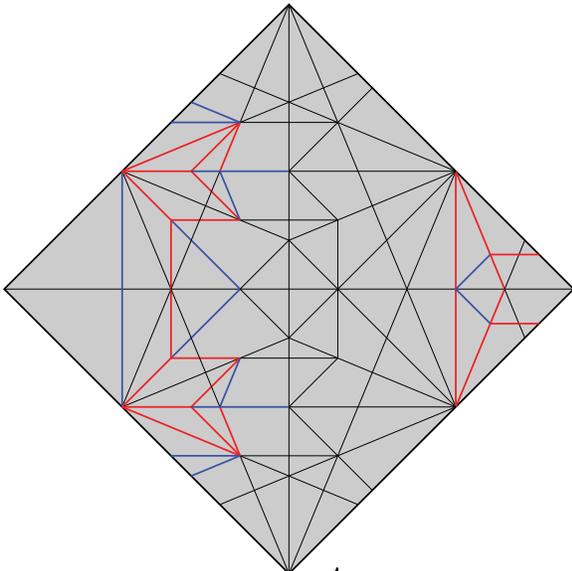
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2

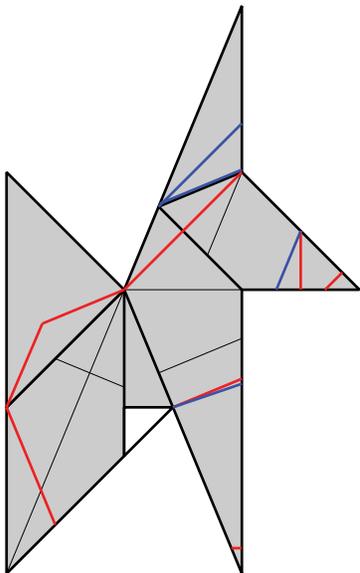


3

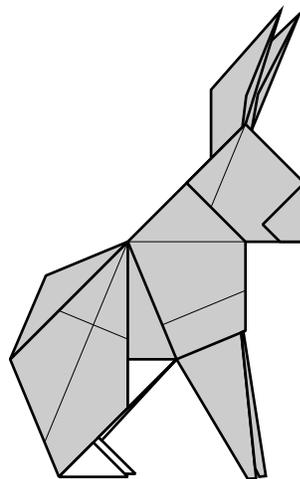


## Shaping

1



2





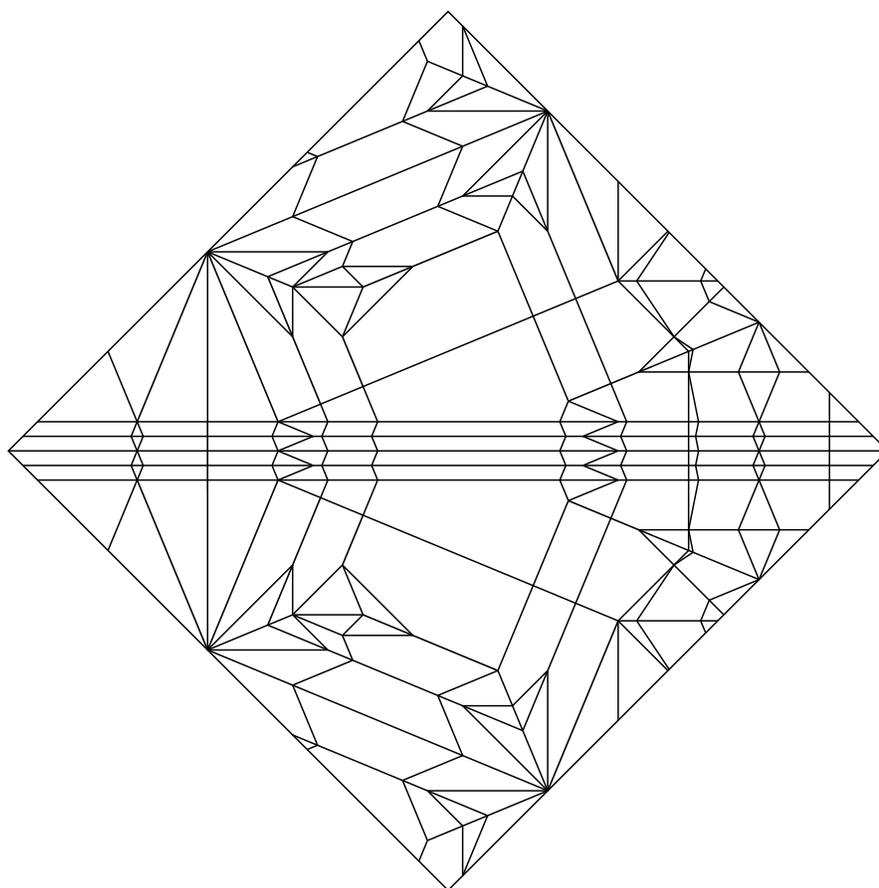
# Cow

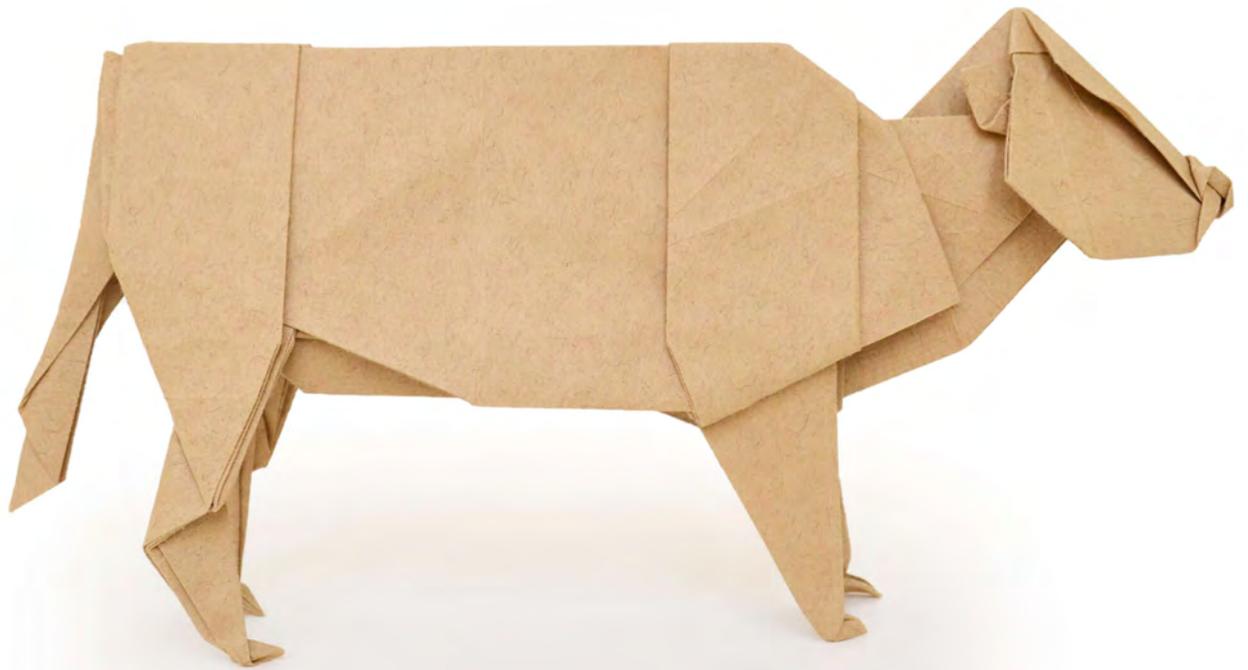
2017

Ingres Paper

9.5 in × 5 in × 2 in

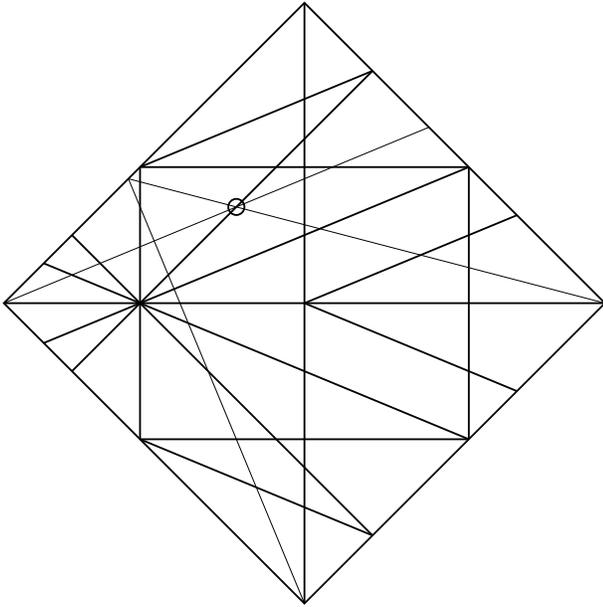
The domestic cow, an often unappreciated mammal in modern society, is a beautiful animal that exudes both strength and gracefulness. The model presented here is a celebration of this animal. From the carefully designed linearity of the frame to the 22.5° styled details, the features come together in a balanced display of minimalism. The arrangement of paper naturally produces a minimally shaped layer structure that imitates the body of this subject. The geometric shapes and angles of the neck form a clean, graceful transition to the head. The 22.5° shaping of the limbs completes the aesthetic look. The cow is one of my favorite subjects to admire and design in origami.



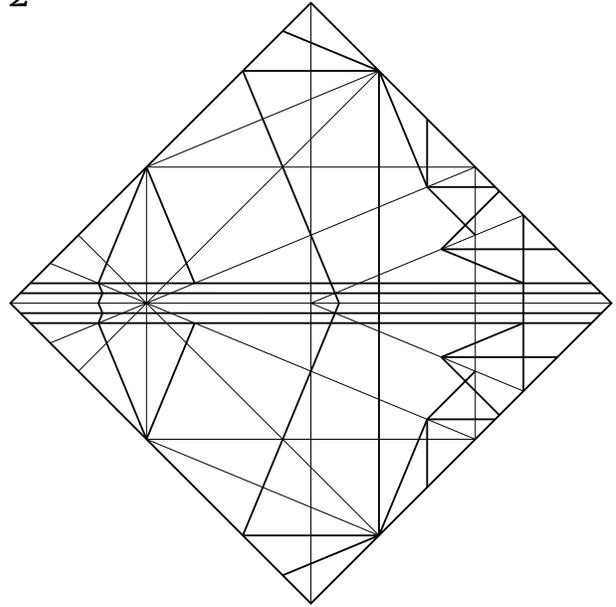


## Precrease

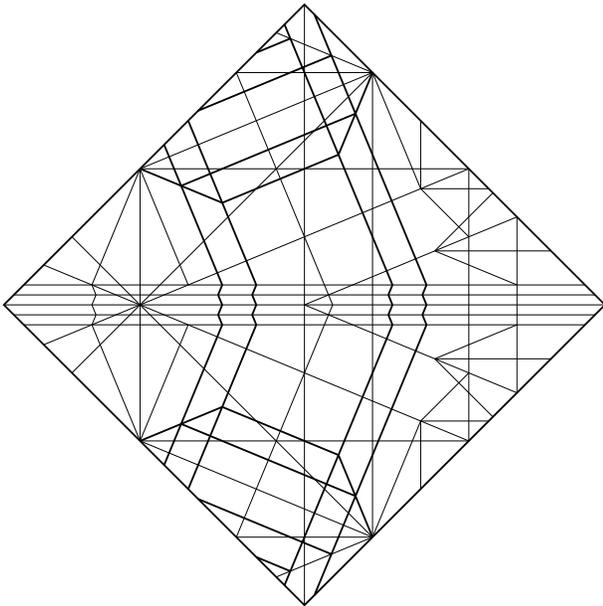
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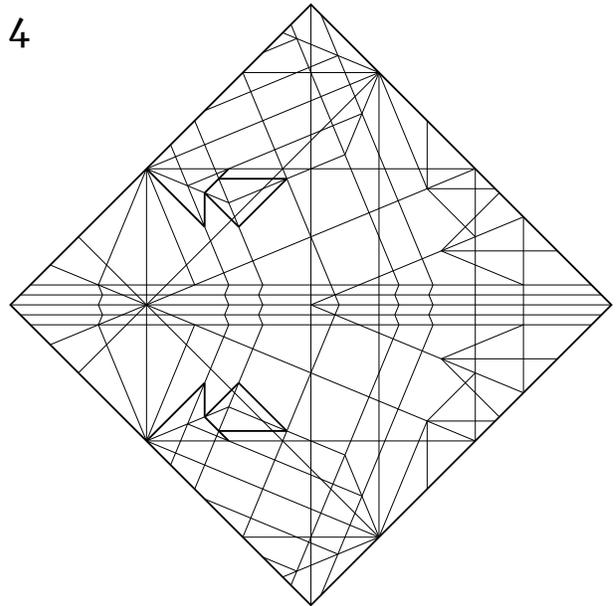
2



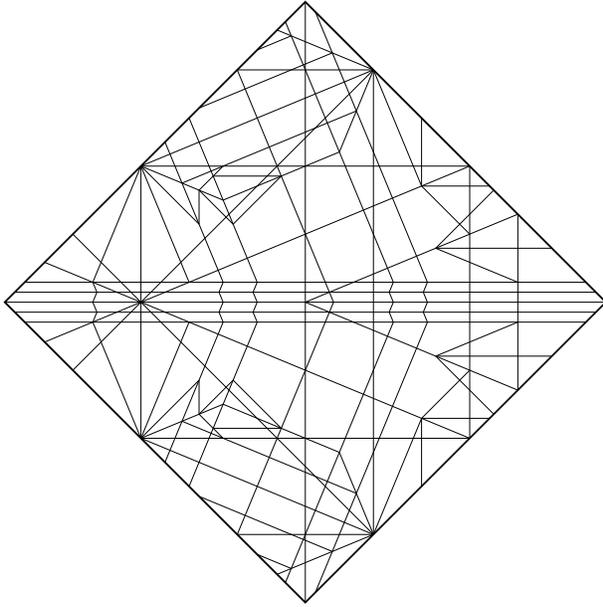
3



4

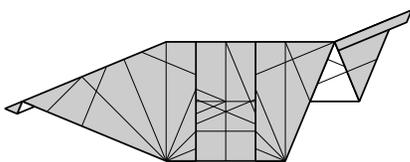
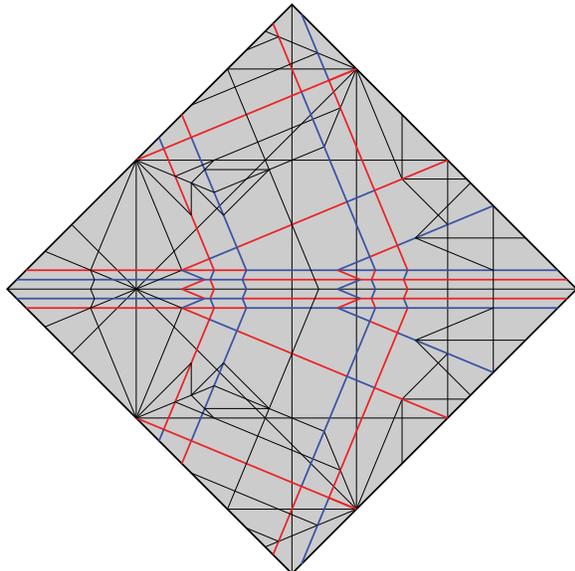


5

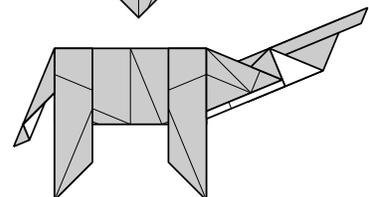
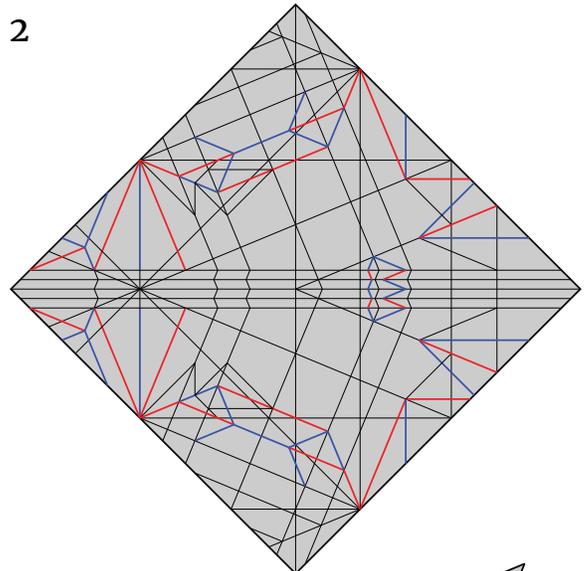


### Collapse

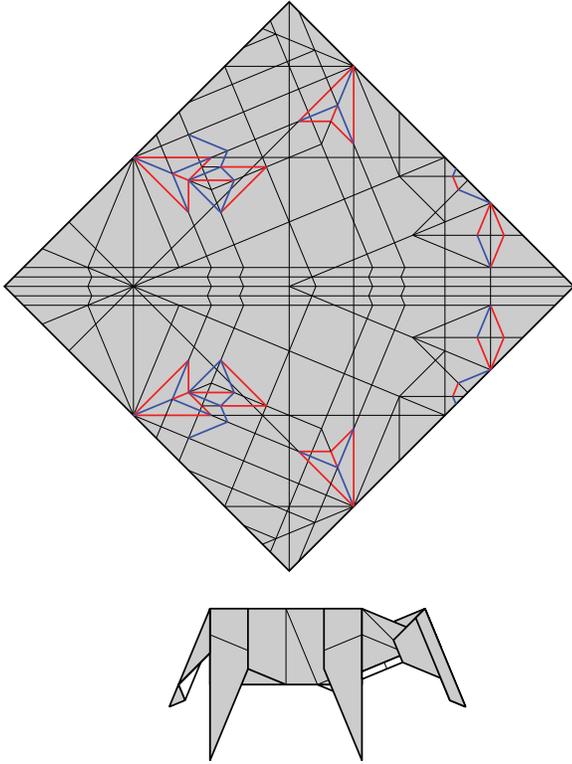
1



2

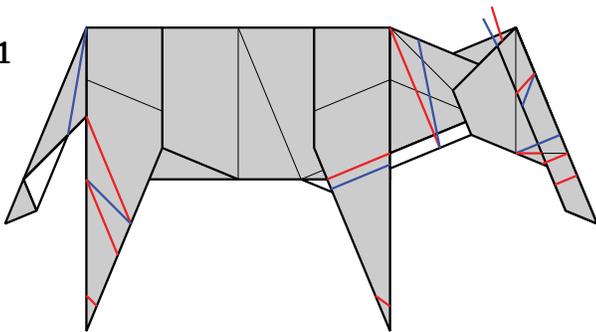


3

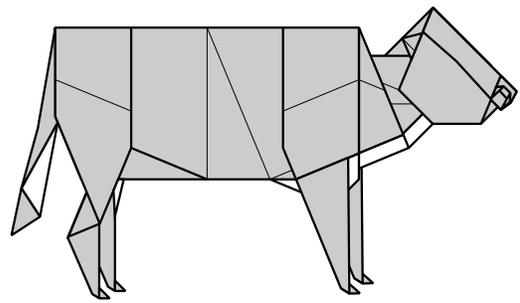


### Shaping

1



2





# Dog

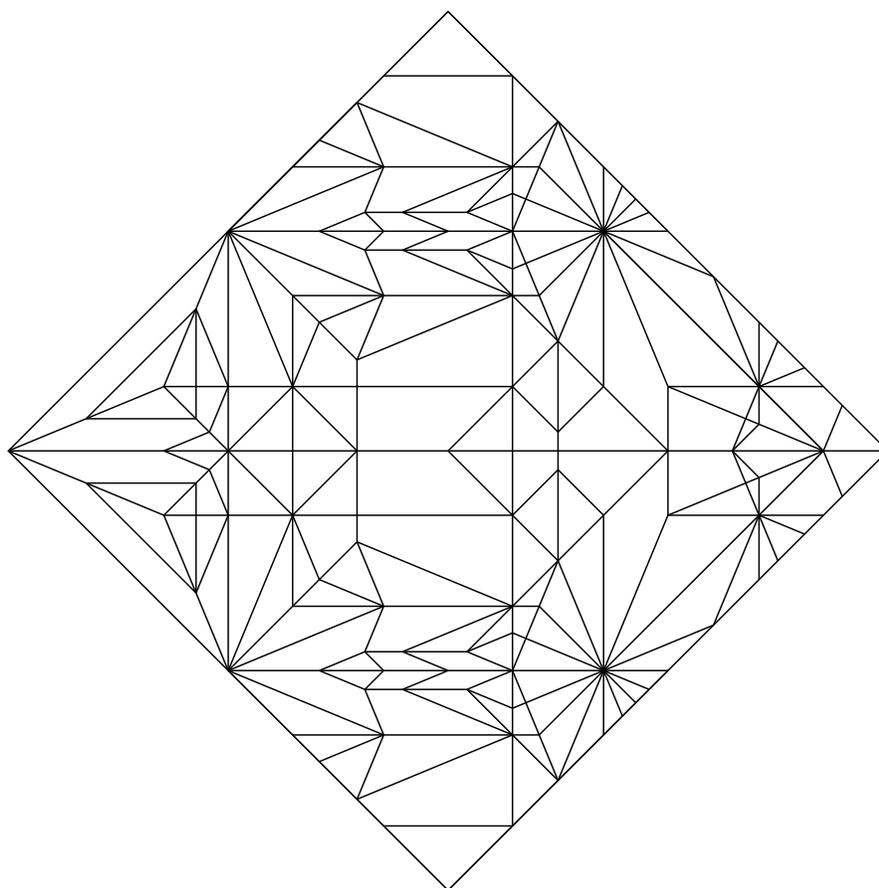
2020

Satogami Paper

9 in × 6 in × 2 in

The goal of the piece was to capture the look of a generic dog in a clean, efficient design. In order to do this, the visual faces of the model should only include what is necessary—no extra lines or creases. In addition, the proportions should be as accurate as possible. This proved to be no easy task.

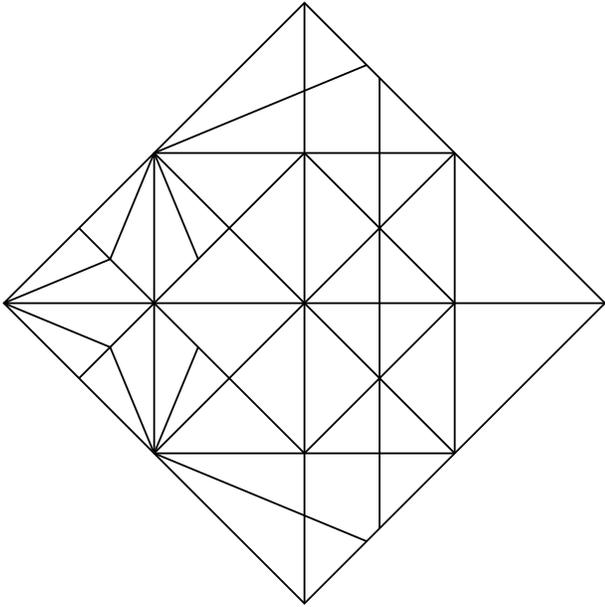
The dog requires a multi-step collapsing sequence that forms the structure of the body and legs. The main body face slants at a  $22.5^\circ$  angle, overlapping an inner horizontal layer to form an abstract and minimal version of the dog's torso. The neck and head are thoughtfully positioned to express a ready pose. Two notable shaping folds elevate this design: the mountain fold above the front legs revealing the neck, and the reverse folds forming a simple kite shape to represent the ears.



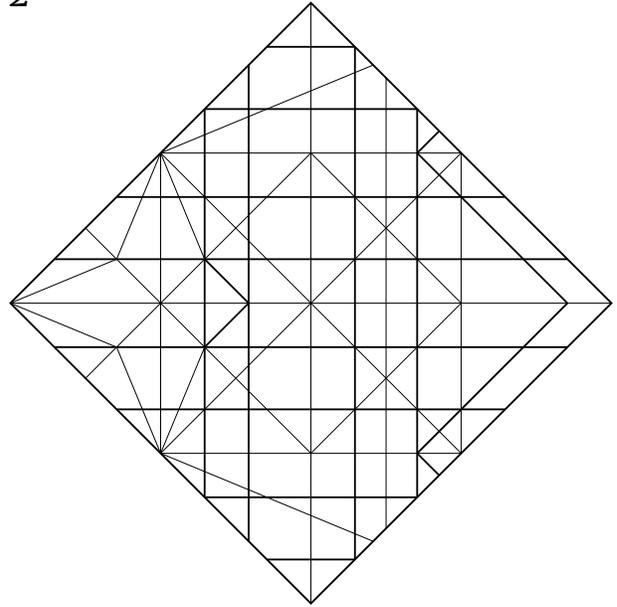


Precrease

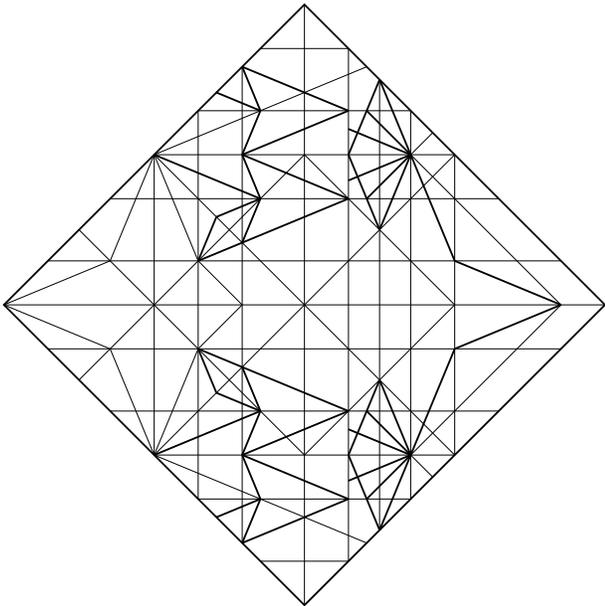
1



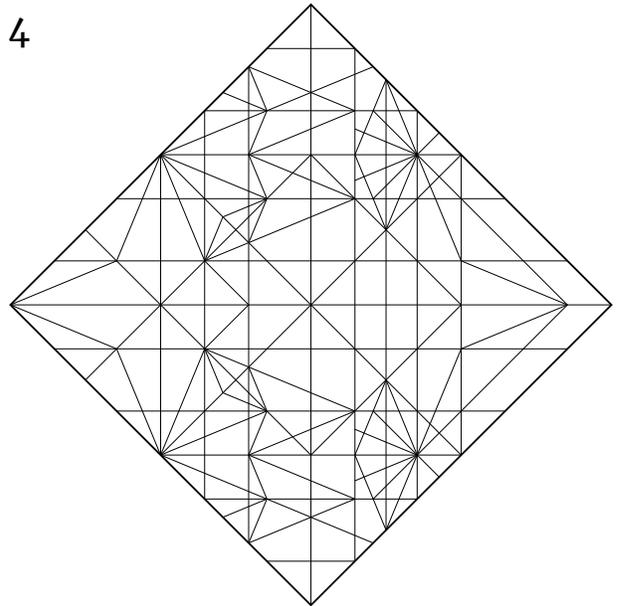
2



3

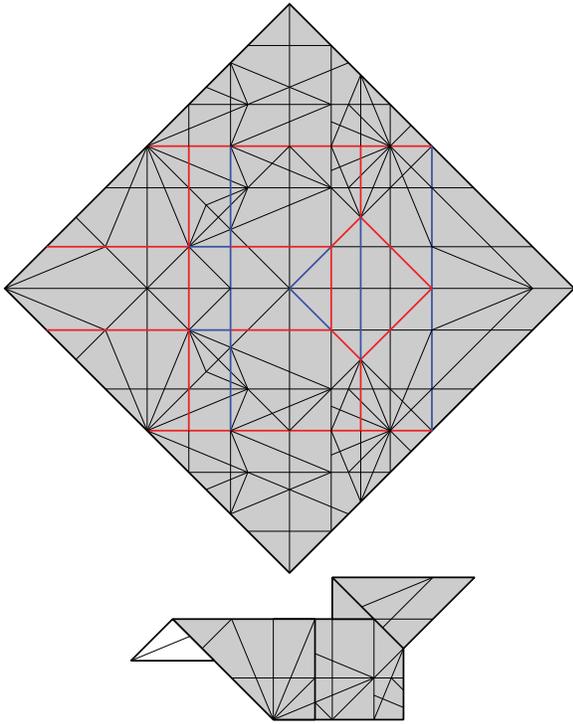


4

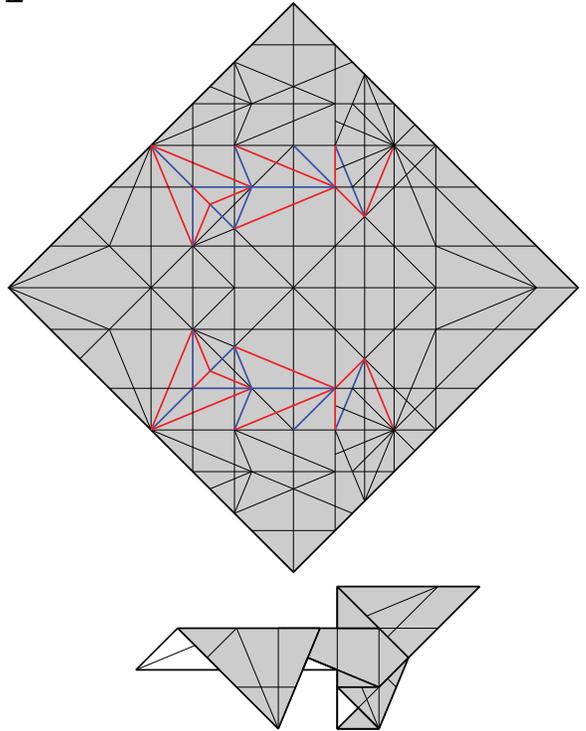


# Collapse

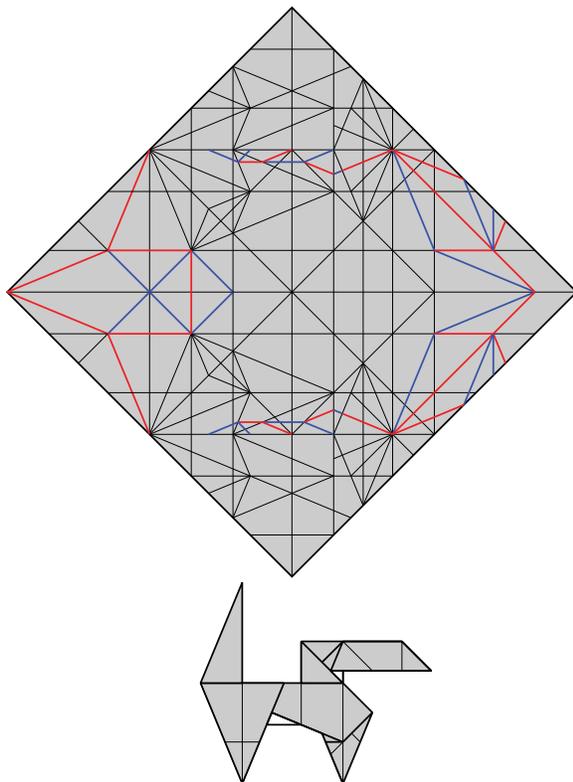
1



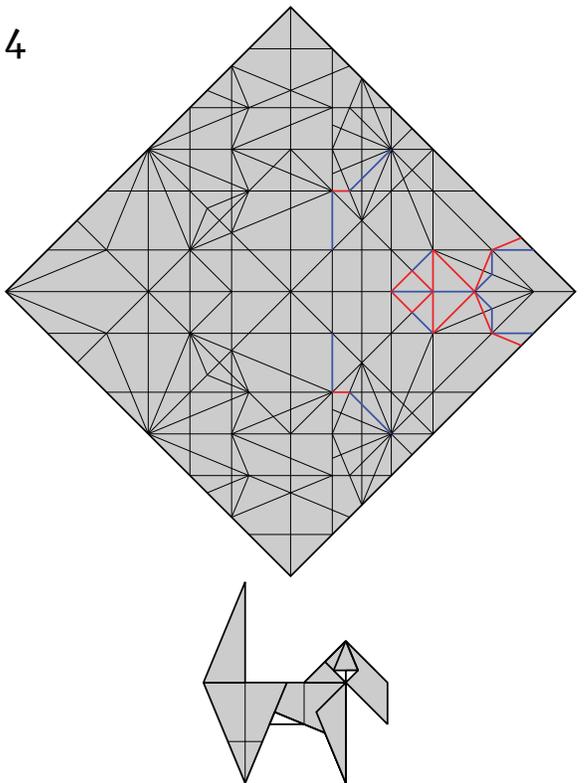
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3

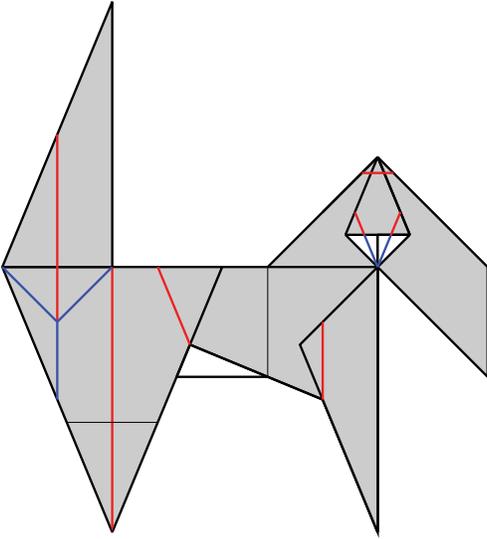


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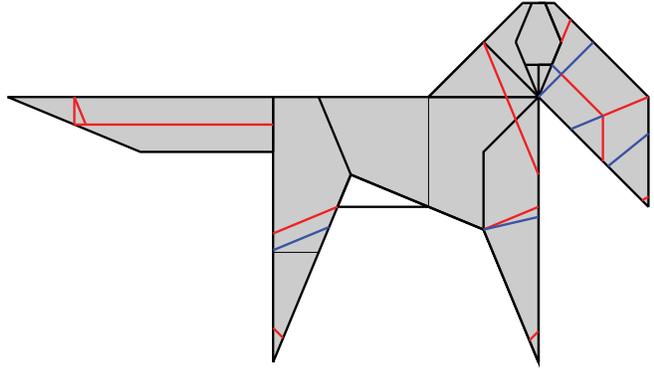


# Shaping

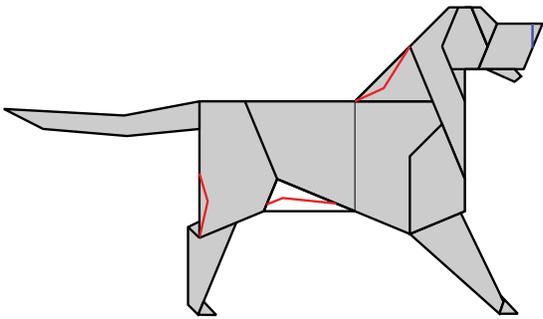
1



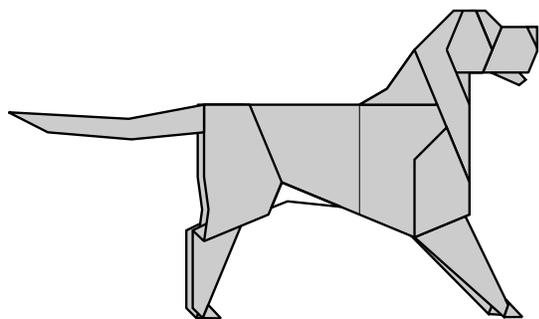
2



3



4





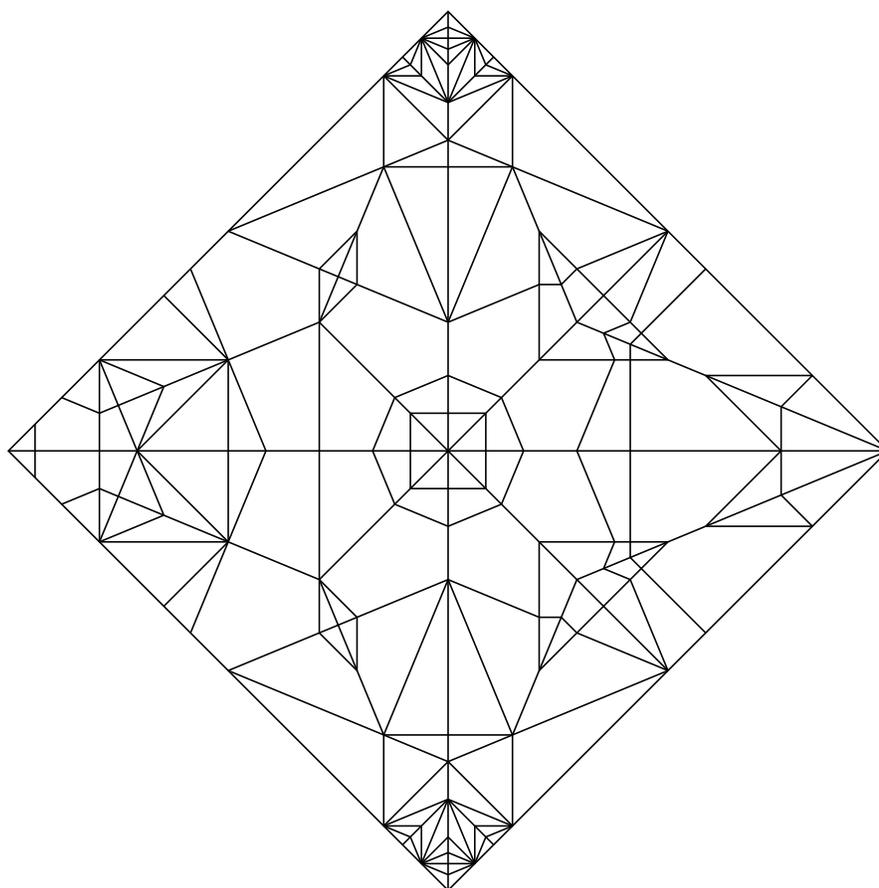
# Chicken

2020

Ingres & Tissue Paper

7 in × 7.5 in × 3.5 in

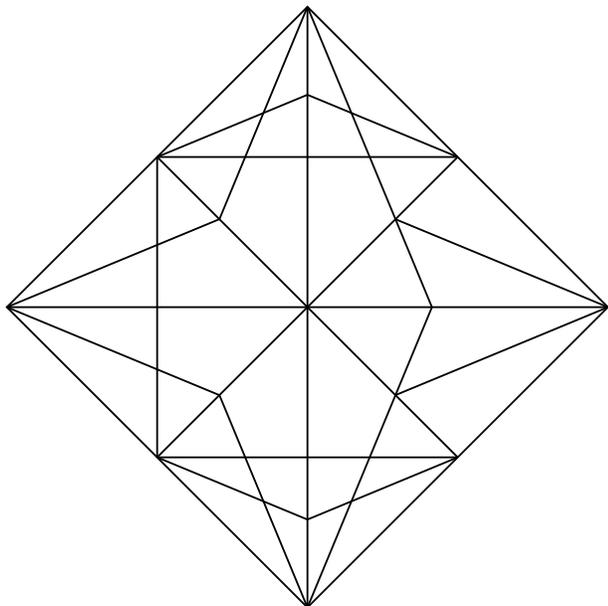
Starting from the traditional bird base, the chicken presents a clean, simple version of a complex subject. The outline of the model and internal lines subtly hint at the visual features of the feathered body. The horizontal line across the body suggests the presence of the wing. The layer connecting the body to the leg imitates the continuation of feathers partially down the legs.



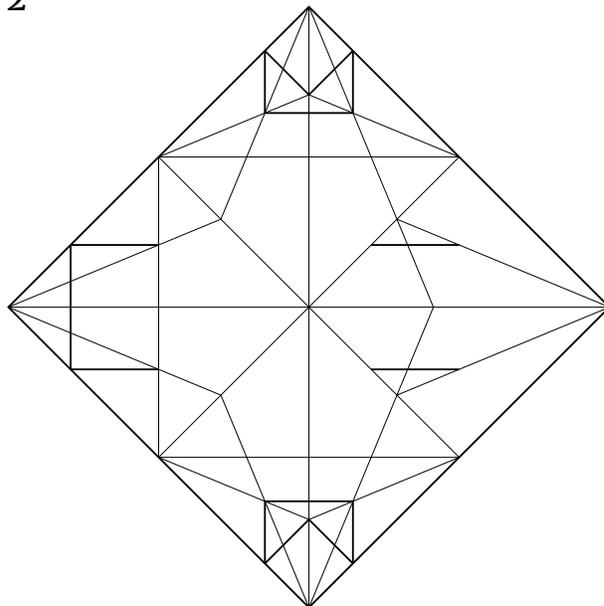


## Precrease

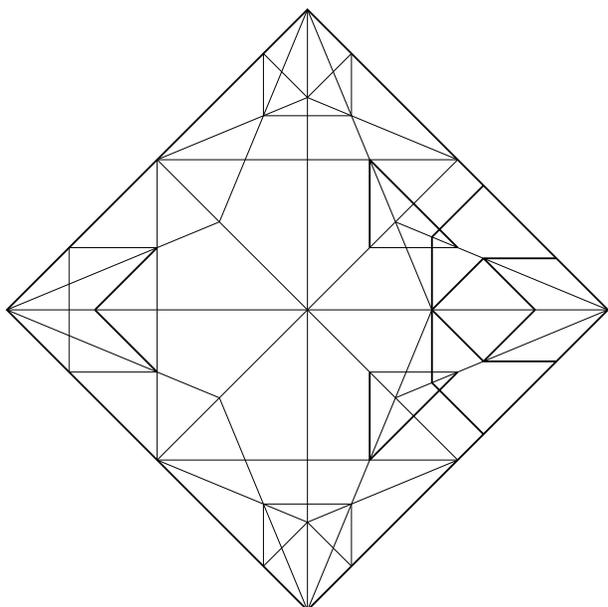
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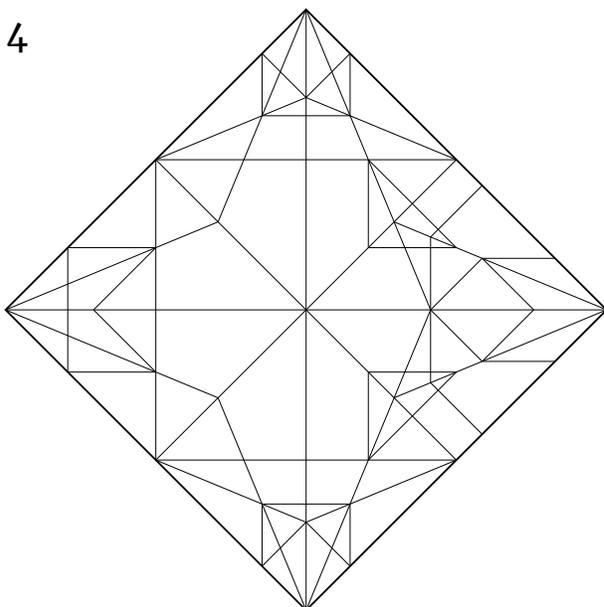
2



3

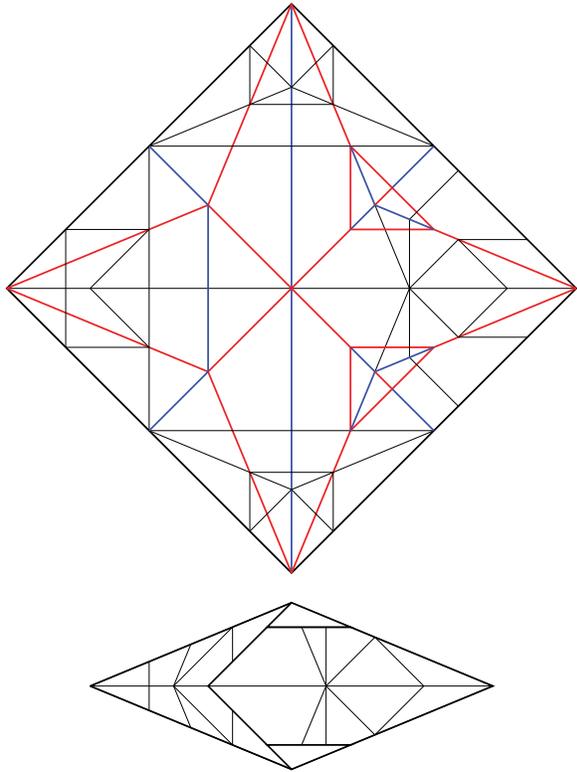


4

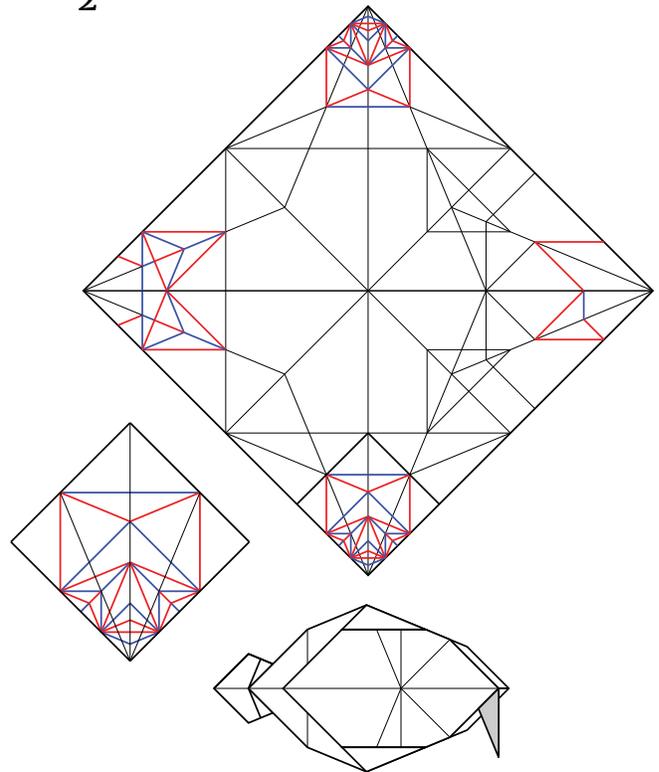


# Collapse

1

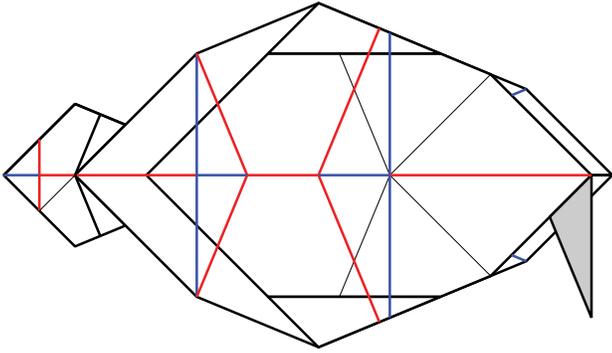


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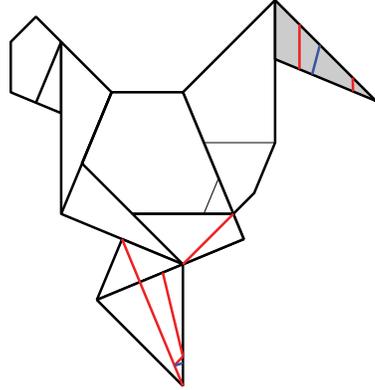


# Shaping

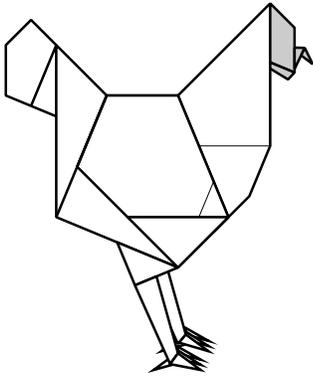
1



2



3





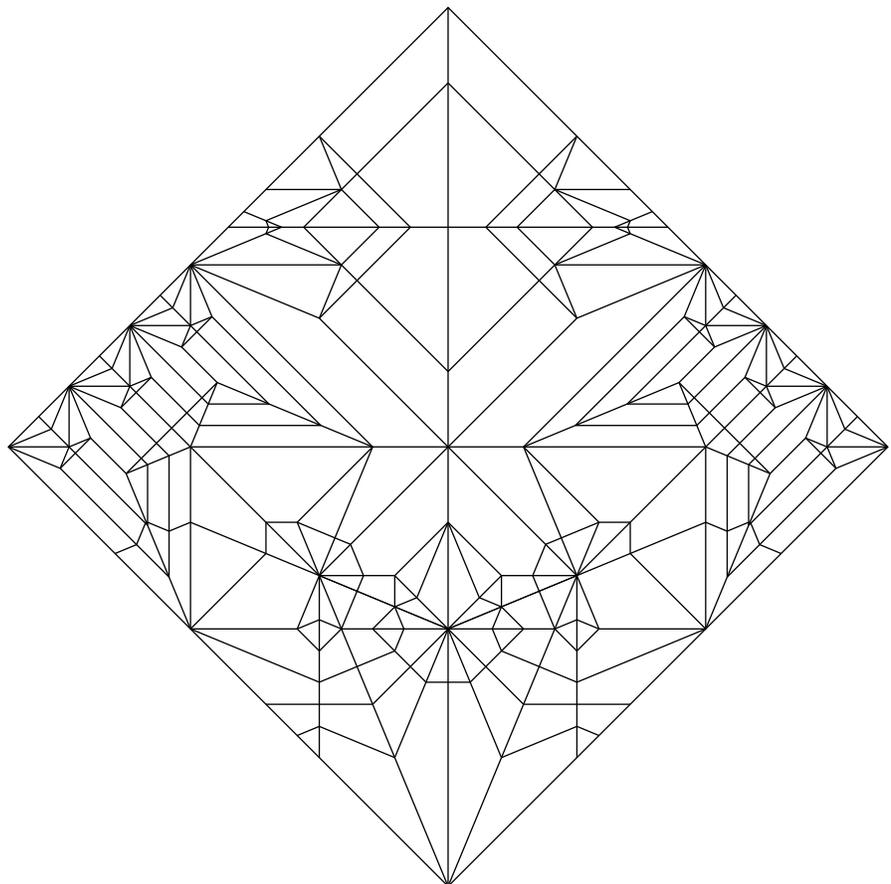
# Bird

2020

Foil Paper

4.5 in × 3 in × 1.5 in

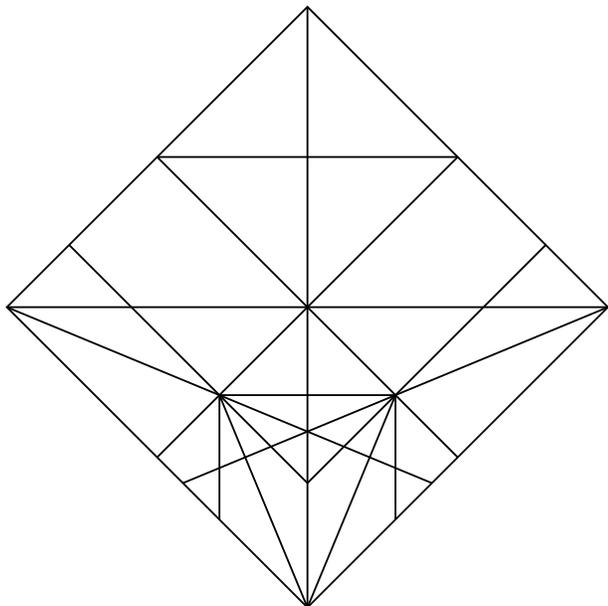
A welcome change from the mammal models, the draft of the bird was unexpectedly completed on my first attempt. Like the other pieces in this series, the goal was to convey simplicity by depicting the body with simple shapes. The wing is minimized to a basic kite shape that is positioned behind another face that represents the head and neck. The back layer forms the structure of the body and produces an acute triangular tail. In addition, the abdomen is a right triangle that utilizes the opposite side of the paper for a color change. The finished bird design is a surprisingly efficient model that displays playful simplicity.



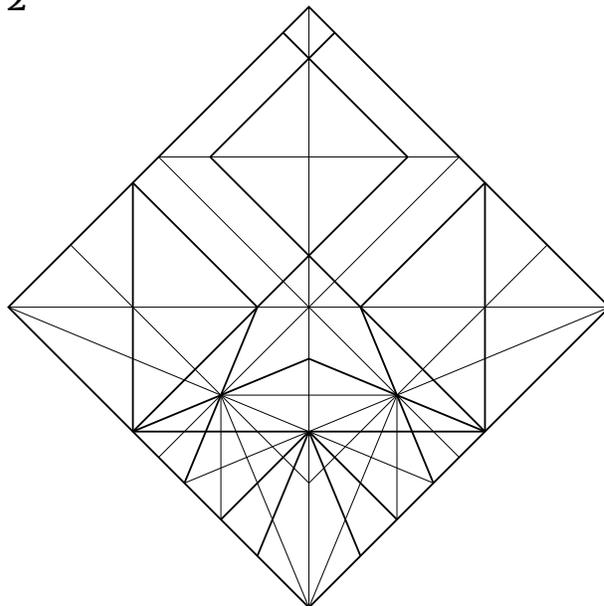


## Precrease

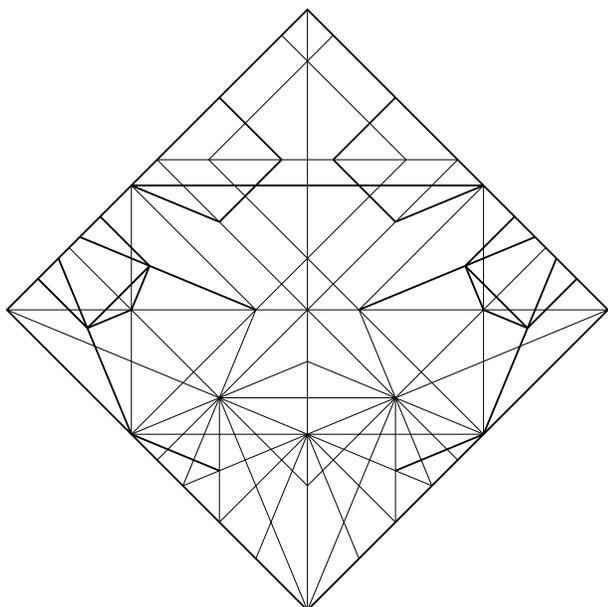
1



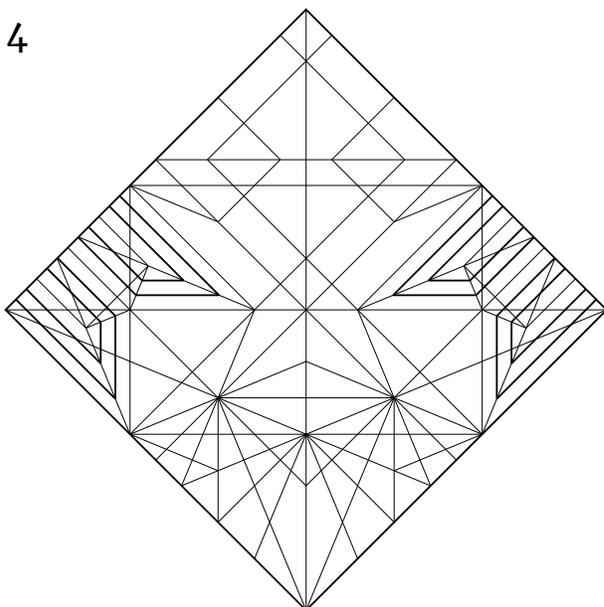
2



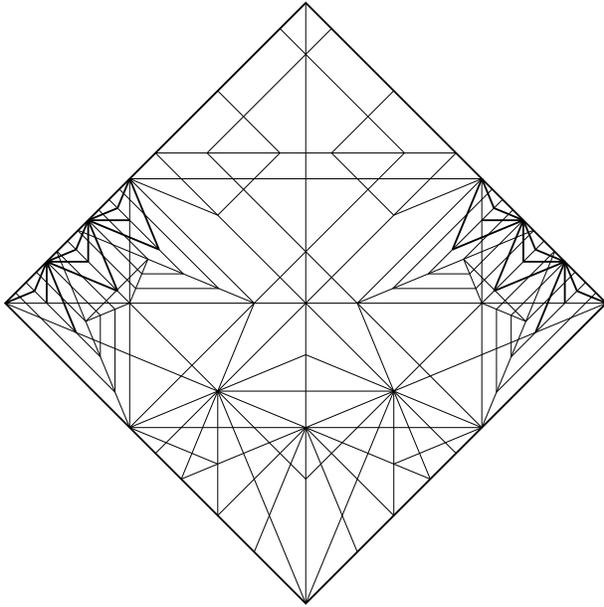
3



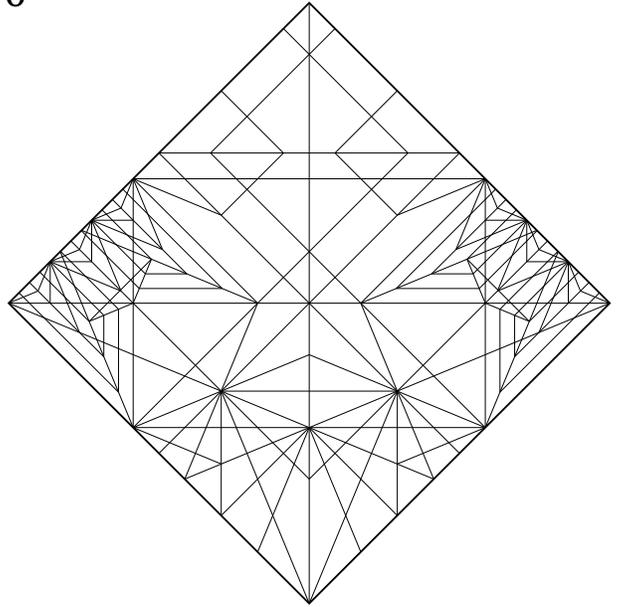
4



5

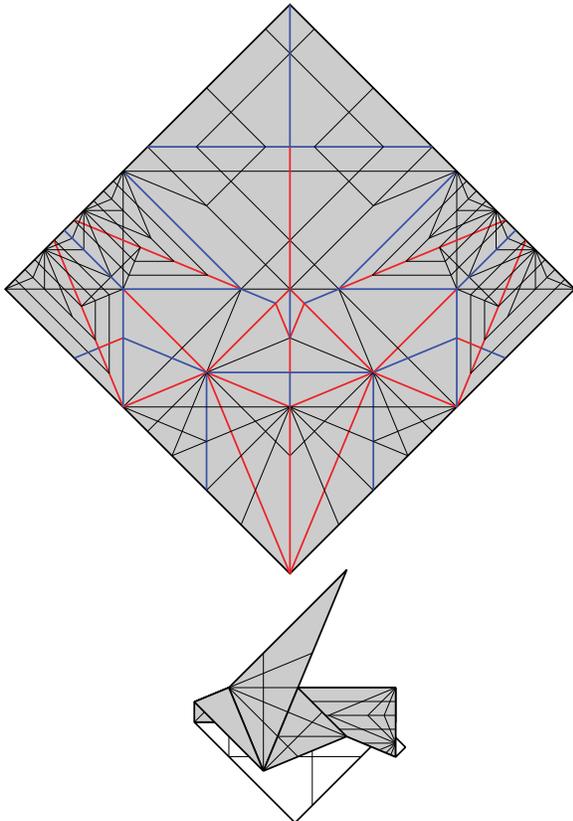


6

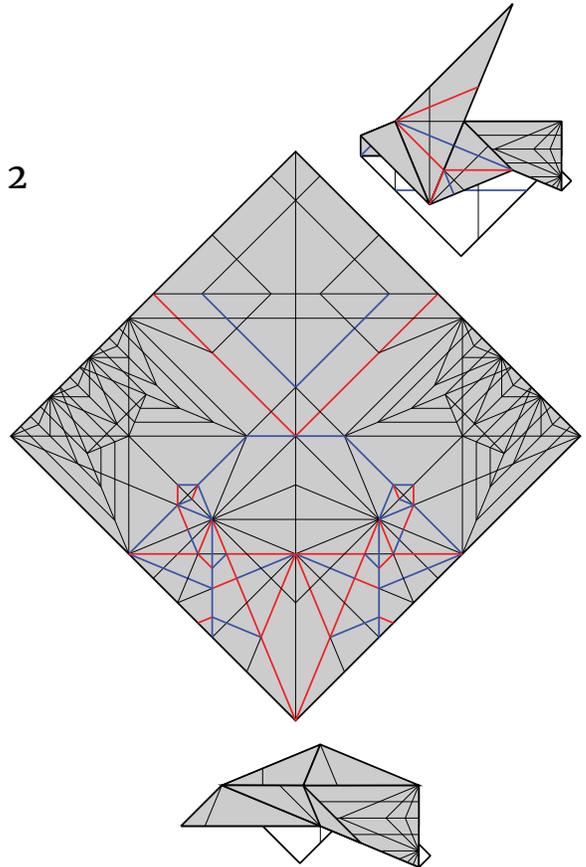


Collapse

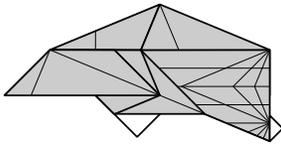
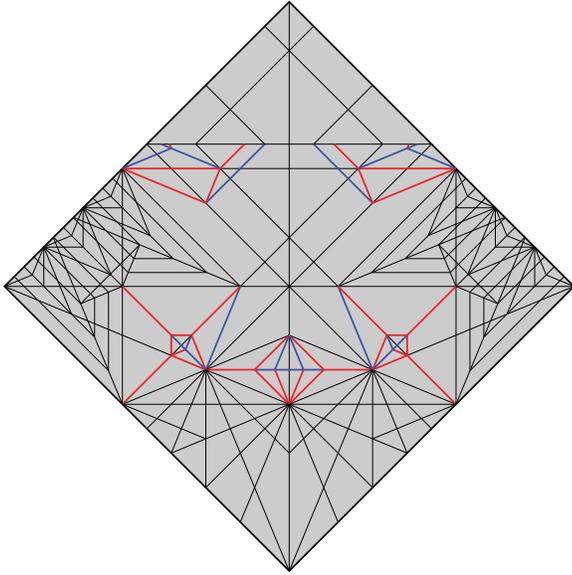
1



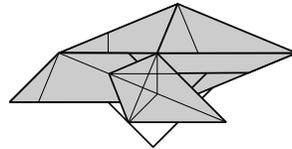
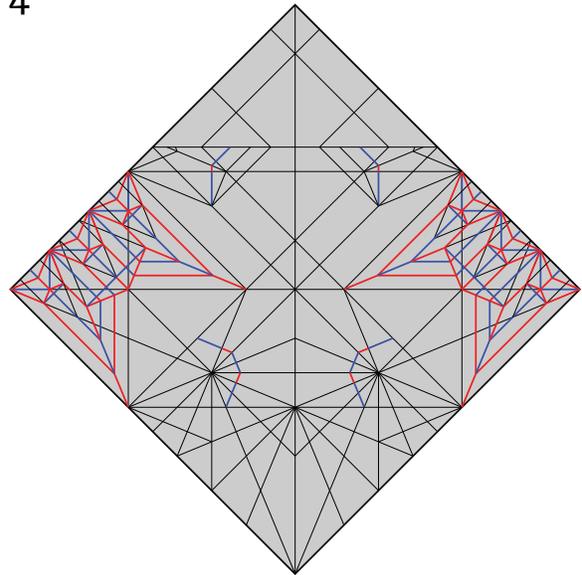
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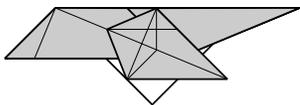
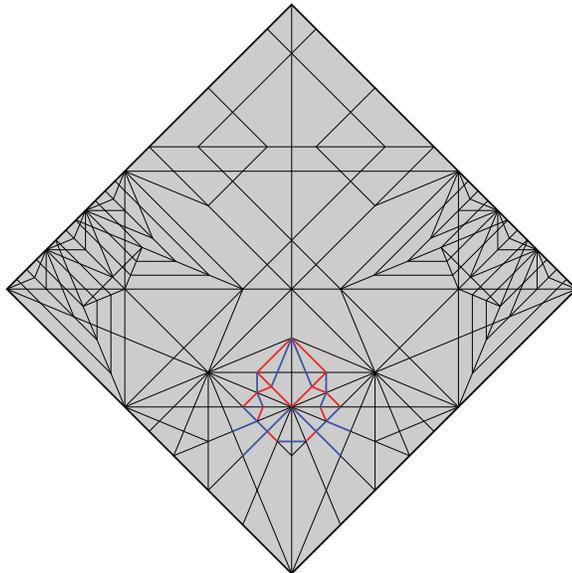
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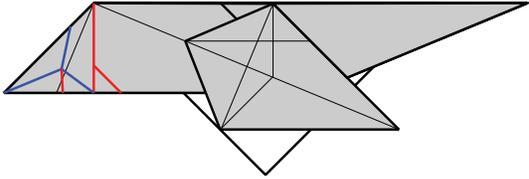


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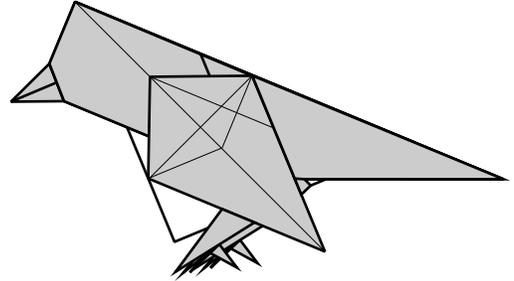


## Shaping

1



2



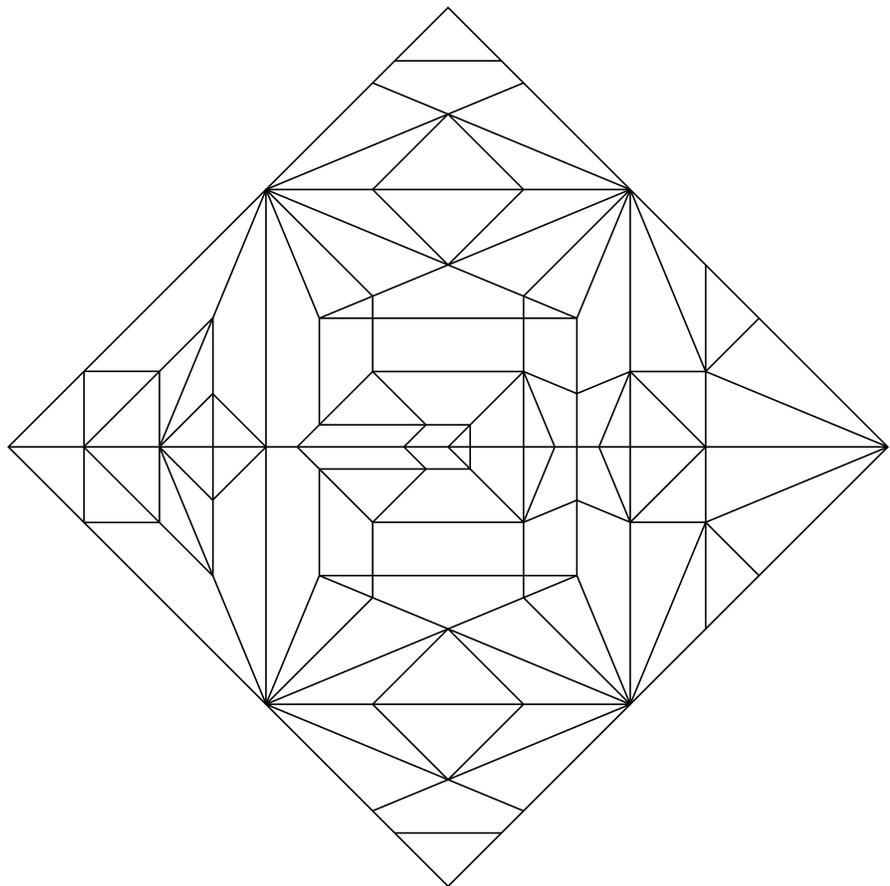
# Horse

2020

Lokhu Paper

7 in × 7 in × 2 in

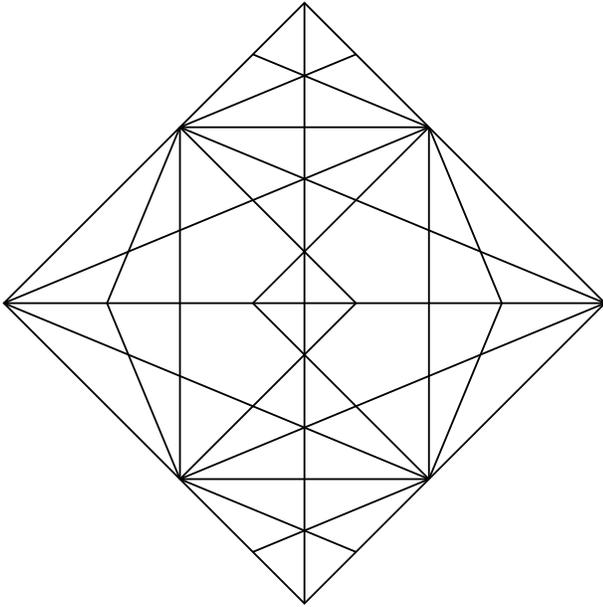
The horse is challenging, but exciting to design due to the high standards set by existing models. My intention with this design was to represent the horse in a bare minimum form consisting of  $22.5^\circ$  shapes, yet communicating a stately and almost uplifting quality. Numerous features were chosen to accomplish this. The taller rectangular body segment juxtaposed above the shorter midsection layer shifts the weight upward. The angled top of the hind legs enhances the uplifted quality of the back end while emphasizing distinction from the main body. The bent front leg continues this stylistic look, and the shaping of the legs is intentionally maintained at a bare minimum. In contrast to the rigid structure of the body, the mane and tail introduce fluidity and organic movement, adding further refinement to the design. Throughout the entire design process, my goal was to perfect an abstract interpretation of the horse. I cannot say I achieved perfection, but I am satisfied for the time being.



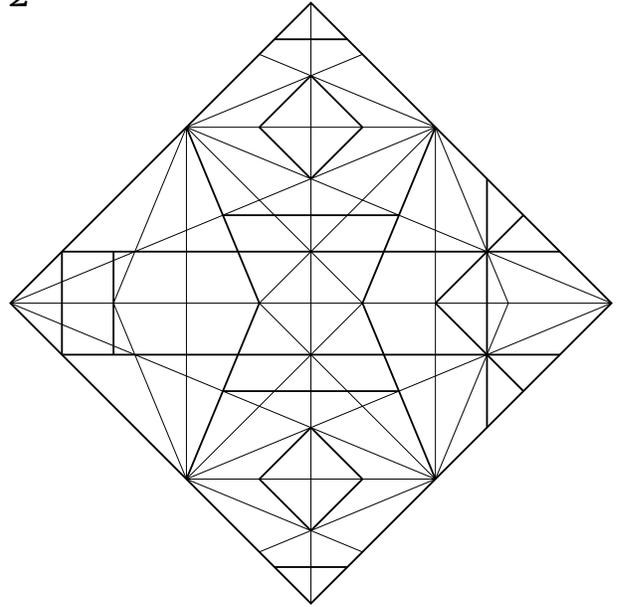


Precrease

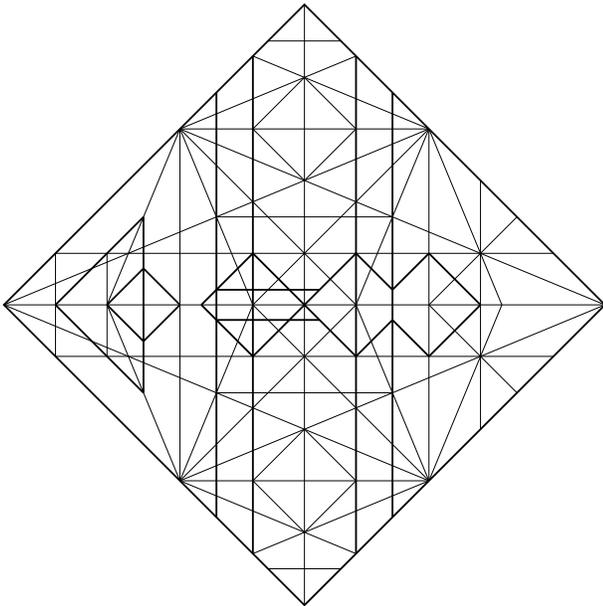
1



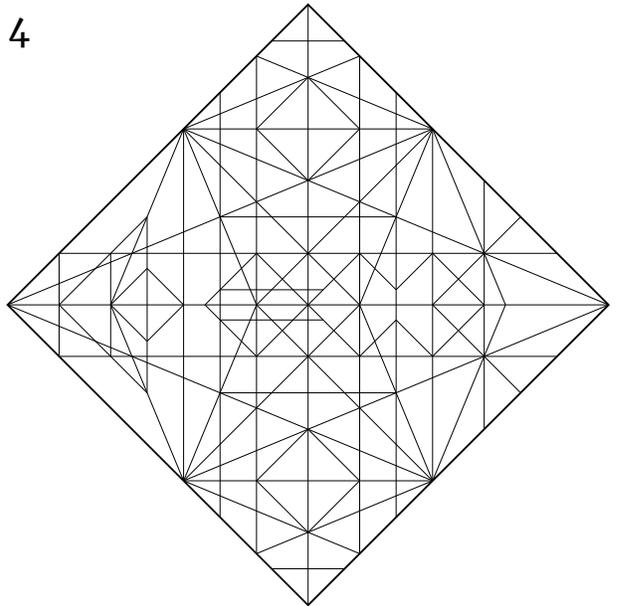
2



3

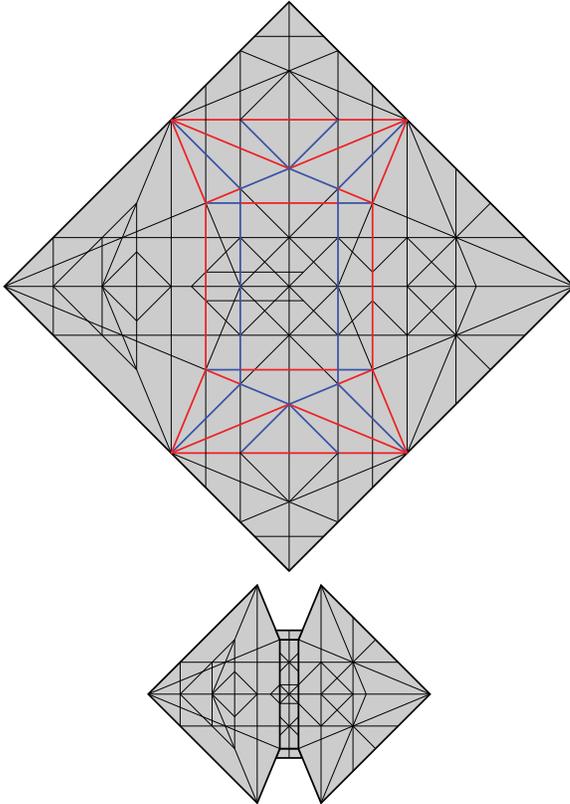


4

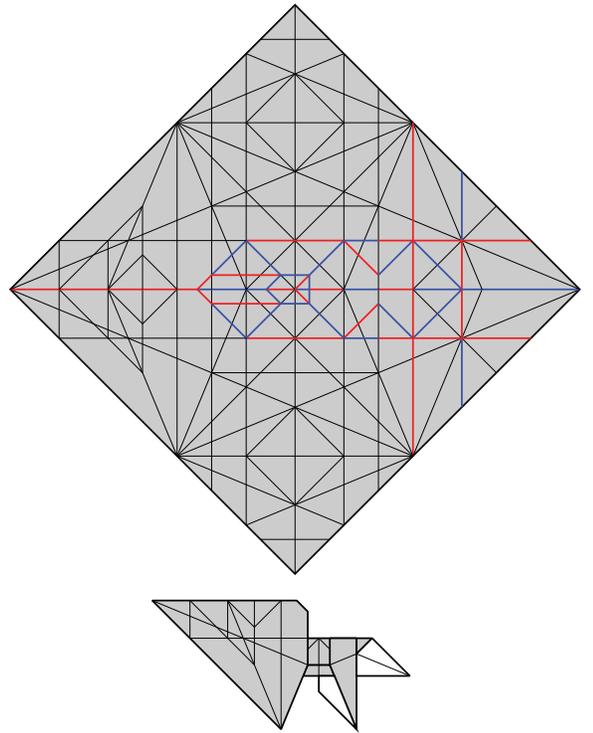


# Collapse

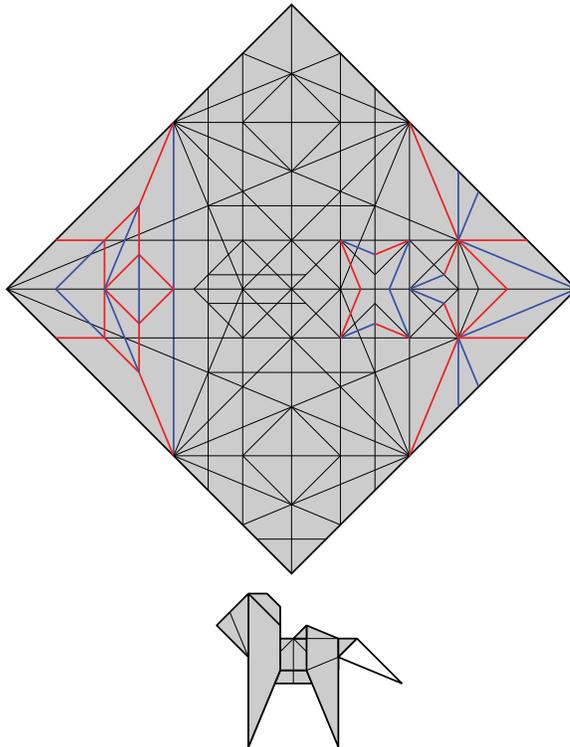
1



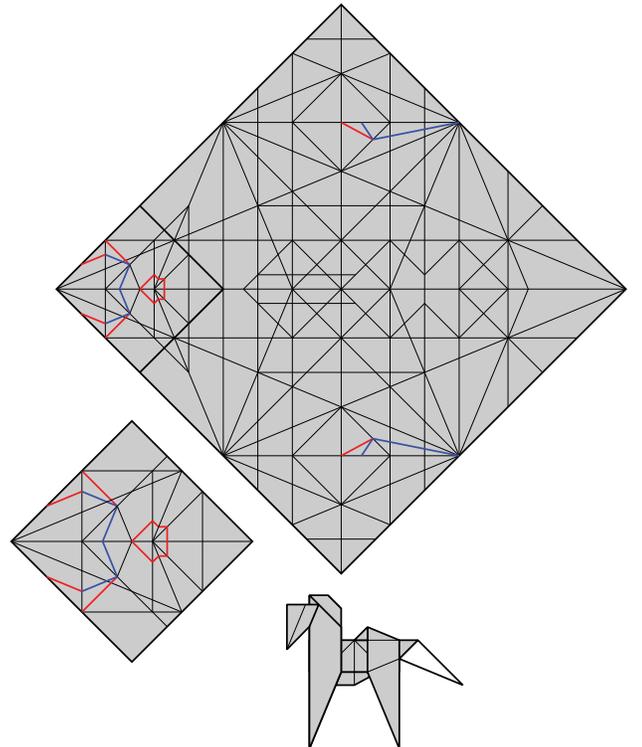
2



3

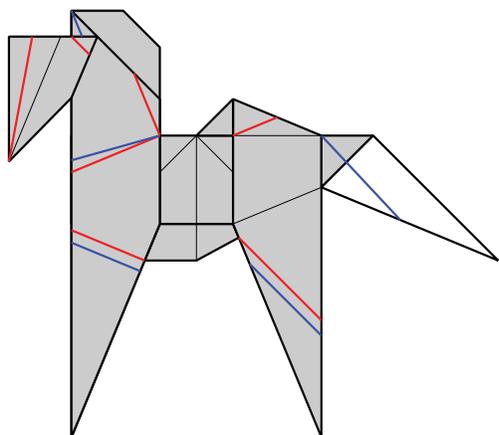


4

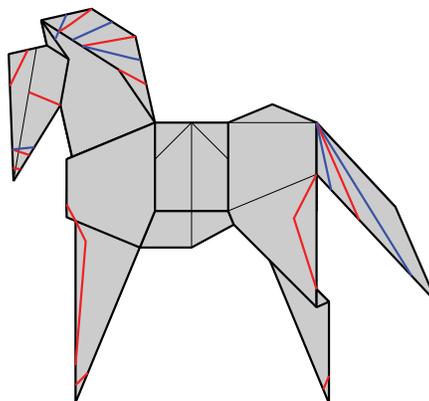


## Shaping

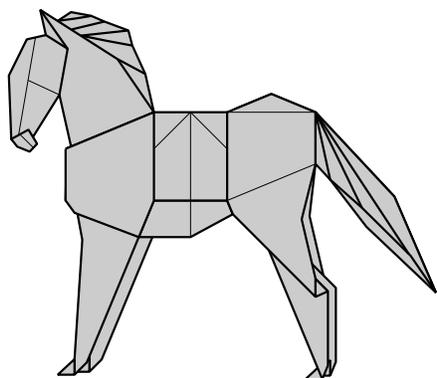
1



2



3





# Panther

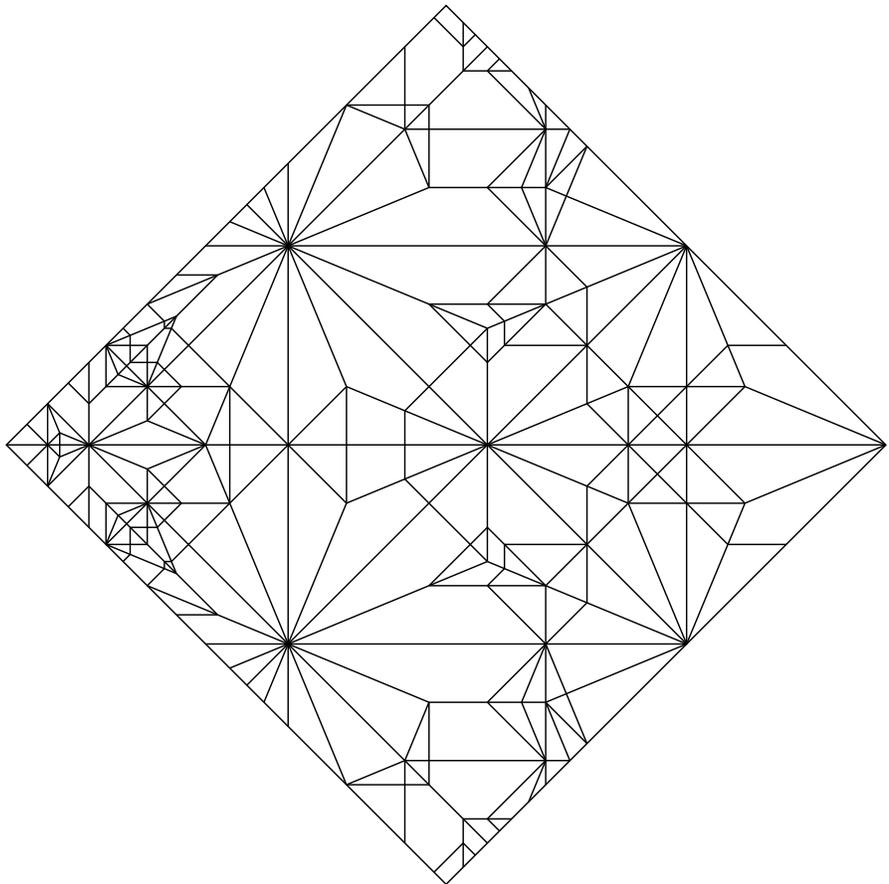
2019

Tant paper

11 in × 5 in × 3 in

This panther design is an exceptional example of the importance of shaping to obtain a desired appearance. The repetition of the sharp shaping angles in the limbs and midsection create a distinct aesthetic quality—one that exemplifies the power and strength of this subject. From the three triangular layers above the two limbs and behind the ear to the minute details in the face, all design features were chosen to refine this specific look.

The panther design is symmetric across the diagonal axis, allowing proper paper distribution for the head and tail. An edge graft is added to distribute paper for the head. While the design is not as efficient as some of my other pieces, the panther still presents an interesting shaping concept that is worth sharing.



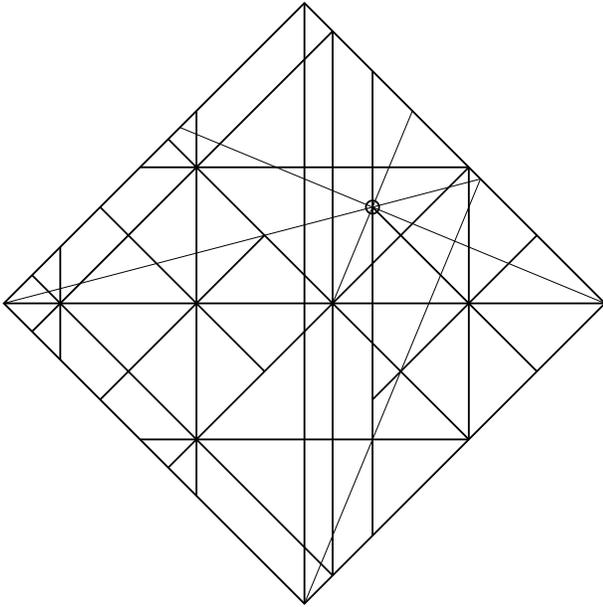




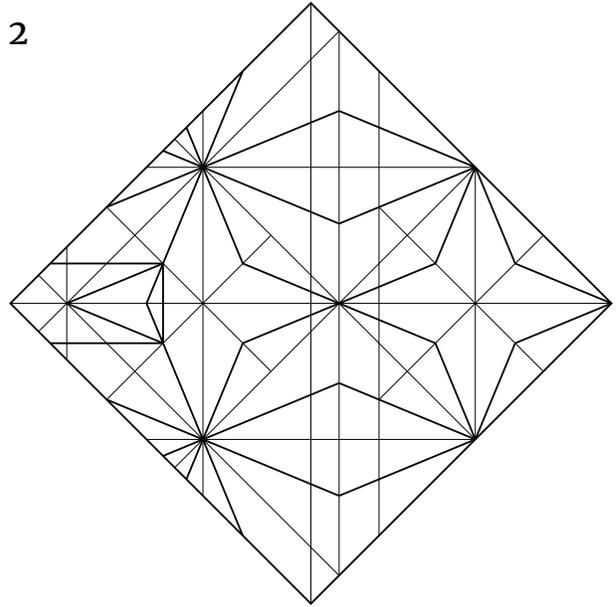


## Precrease

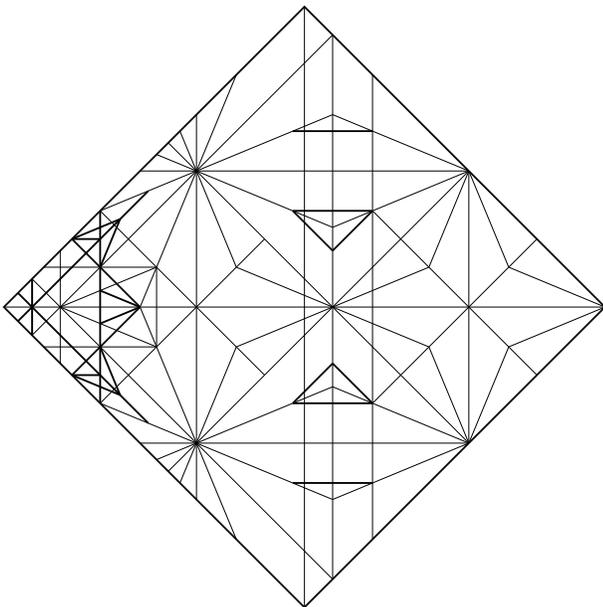
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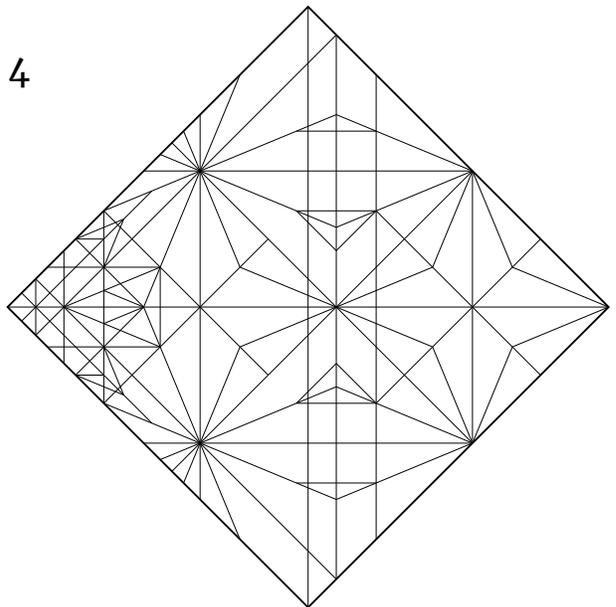
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3

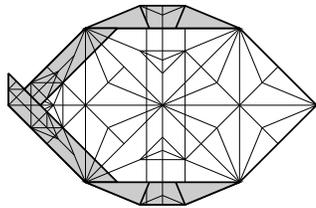
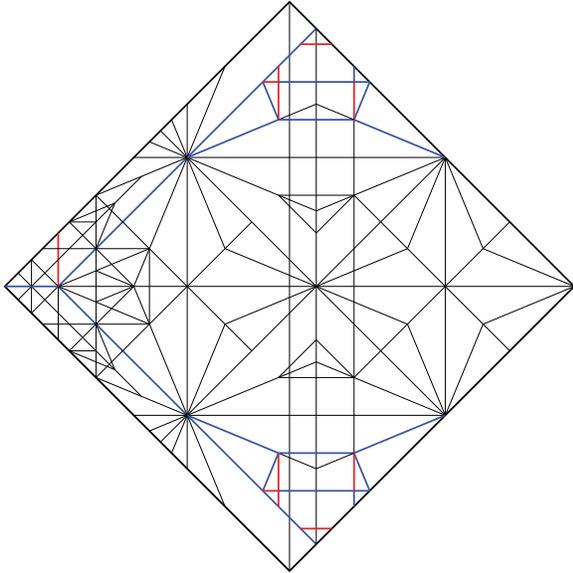


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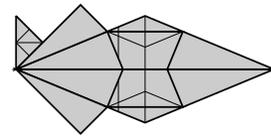
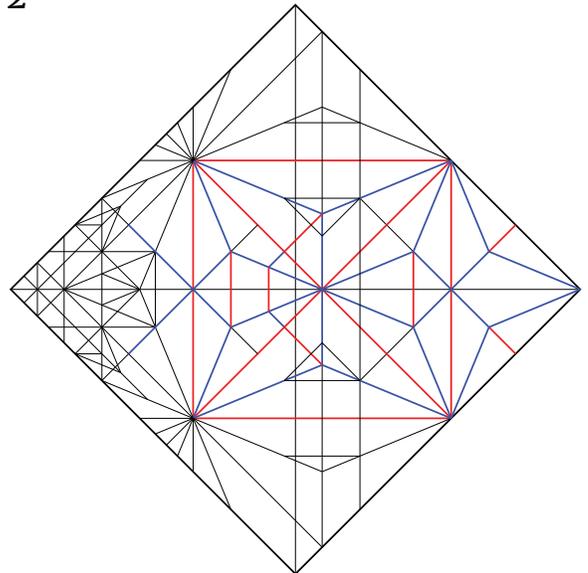


# Collapse

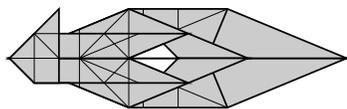
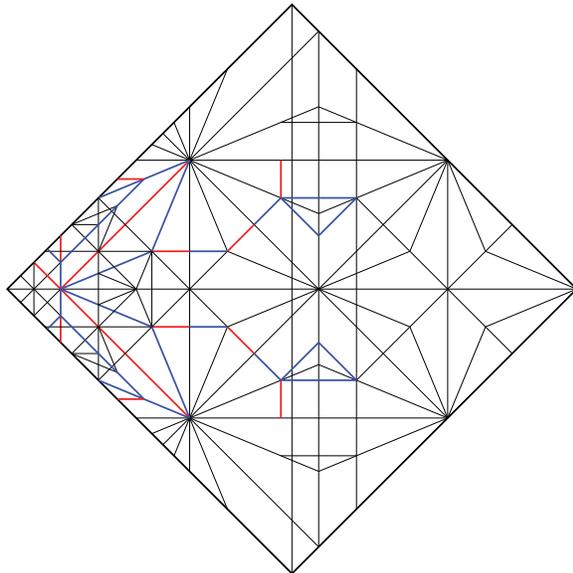
1



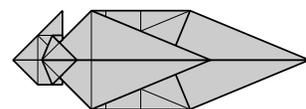
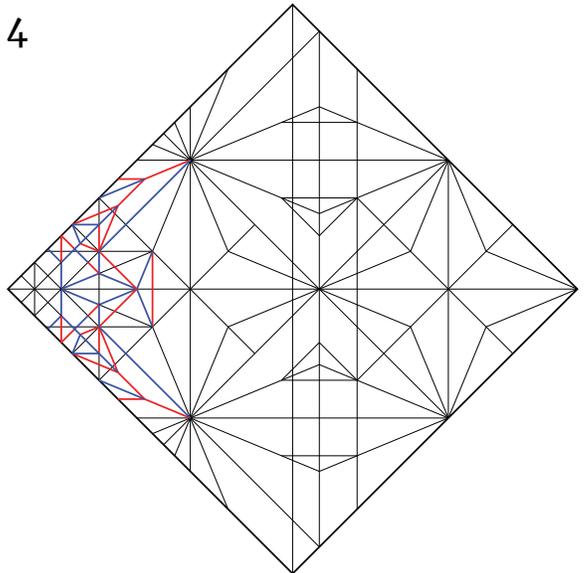
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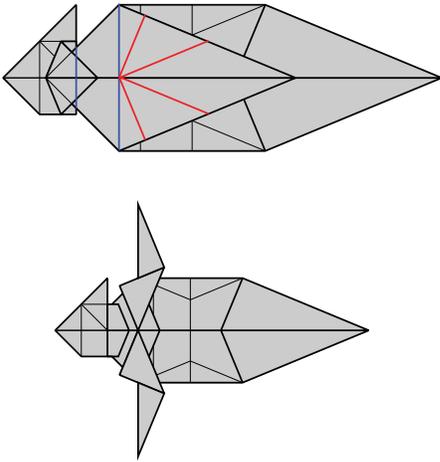
3



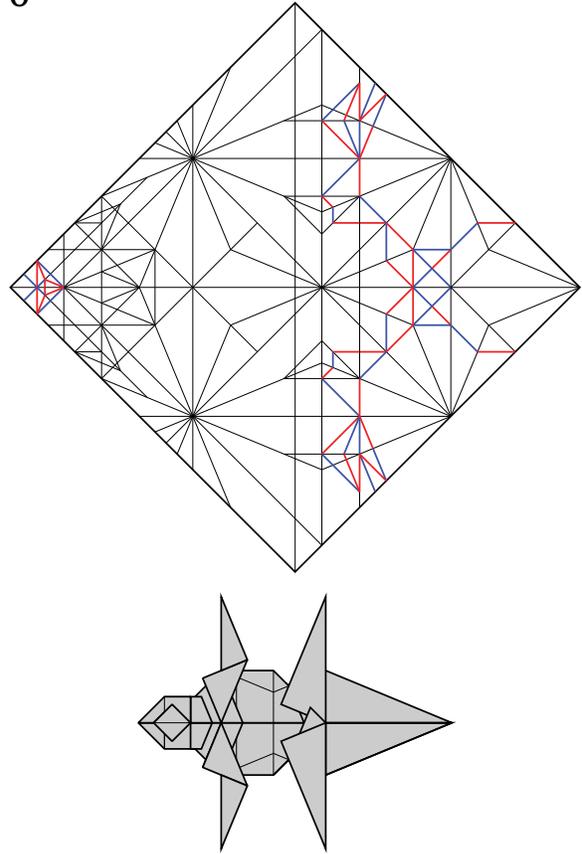
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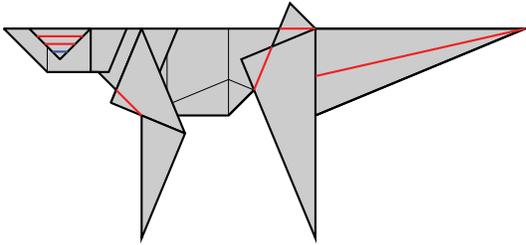


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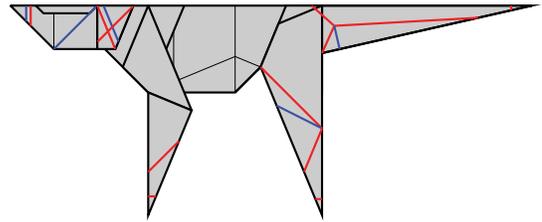


## Shaping

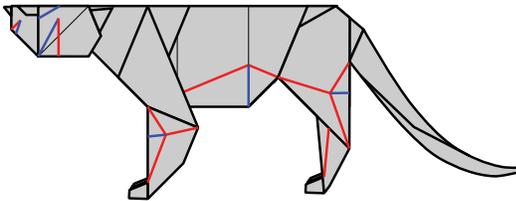
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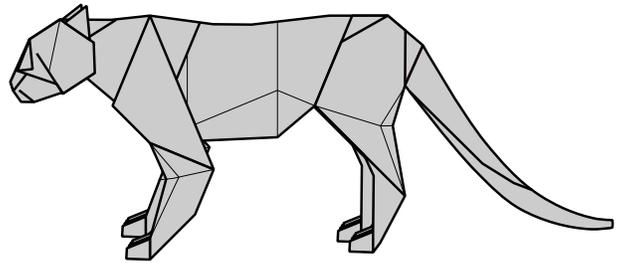
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3



4



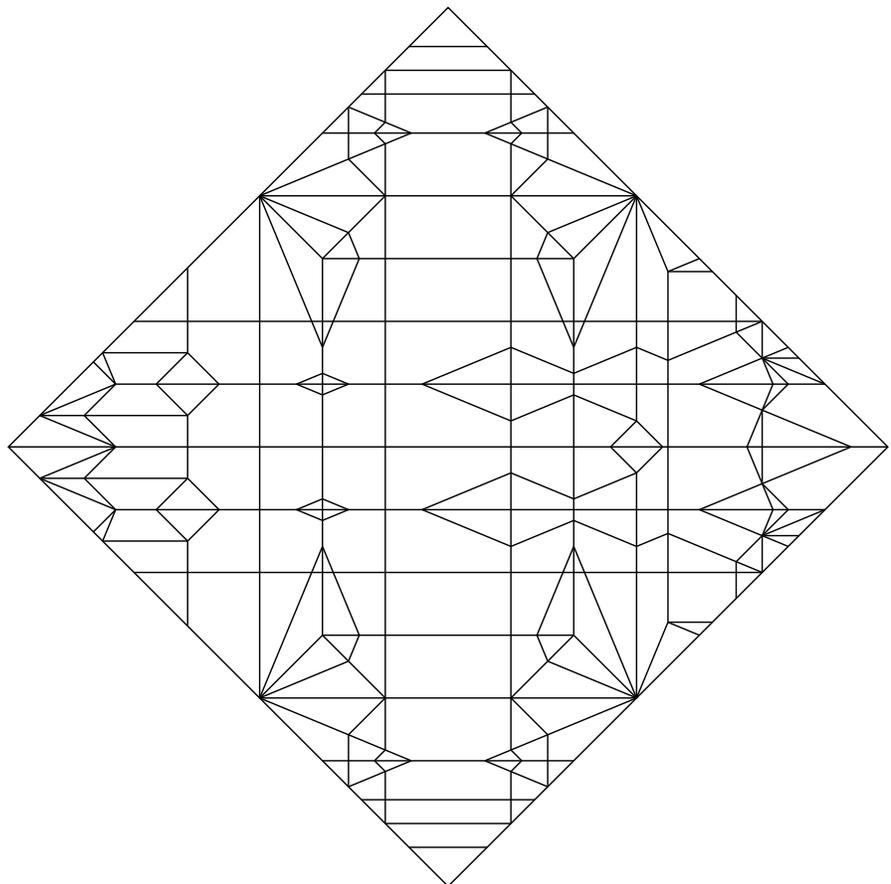
# Wolf

2020

Thai Banana & Unryu Paper

11 in × 5.5 in × 2 in

In a wonderful display of white and gray patterning, the wolf is an excellent example of color change technique and calculated proportions. The design is based on a 14 x 14 grid, with 22.5°-style features integrated into the base structure. The gray shade defining the wolf's coat color runs across the model in a logical, natural manner. The raised neck beautifully transitions the main torso to the head design. The tail is carefully proportioned to line up against the hind legs. While most of the other models in this series are strictly based on 22.5° style, sometimes it is the model that chooses its most appropriate design structure, as was the case here.



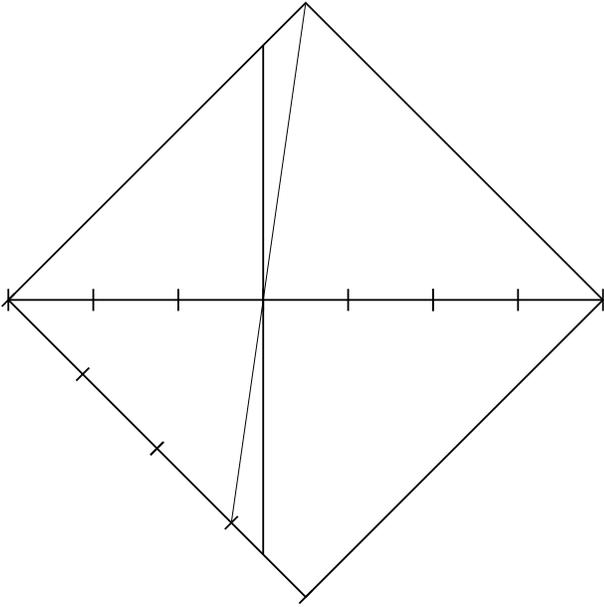




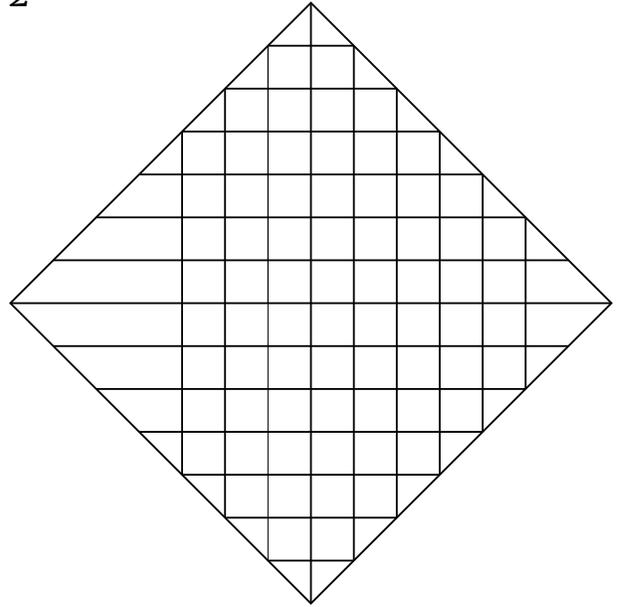


# Precrease

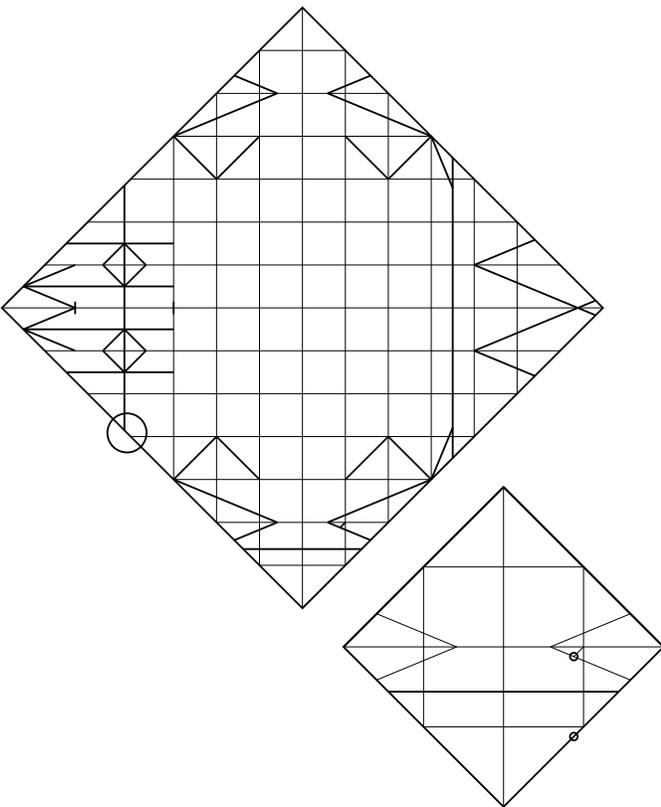
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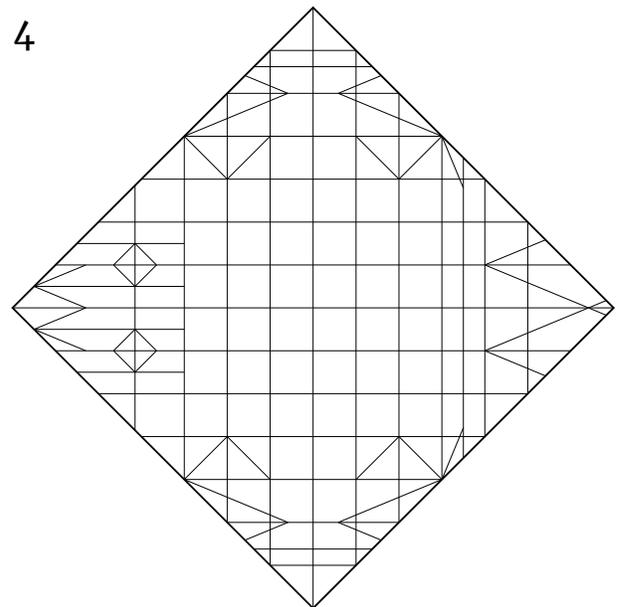
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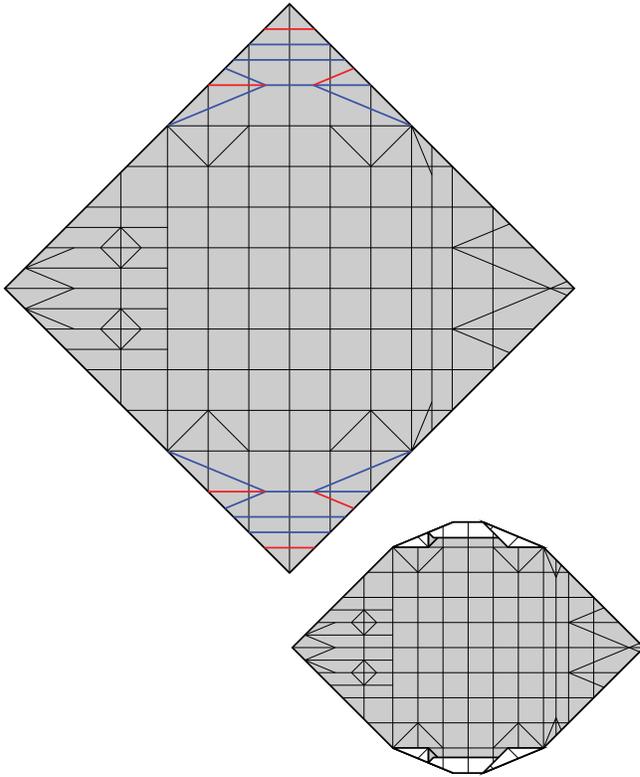


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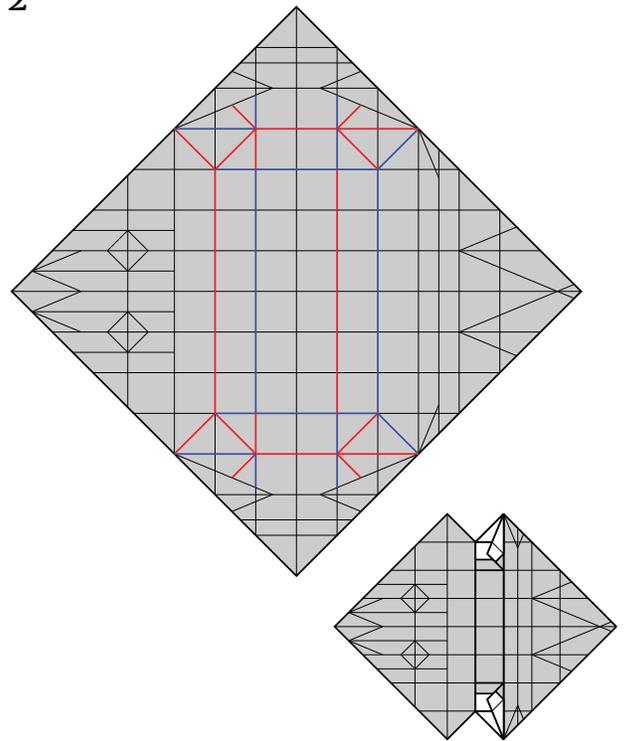


# Collapse

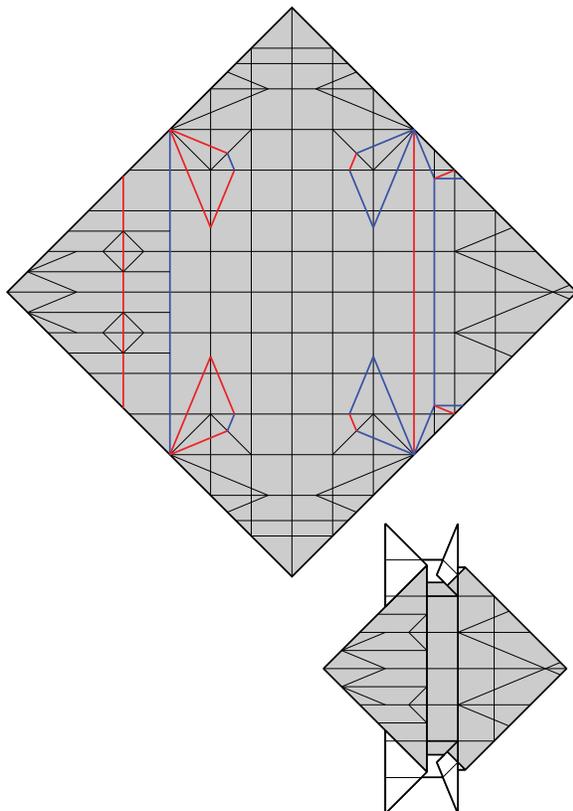
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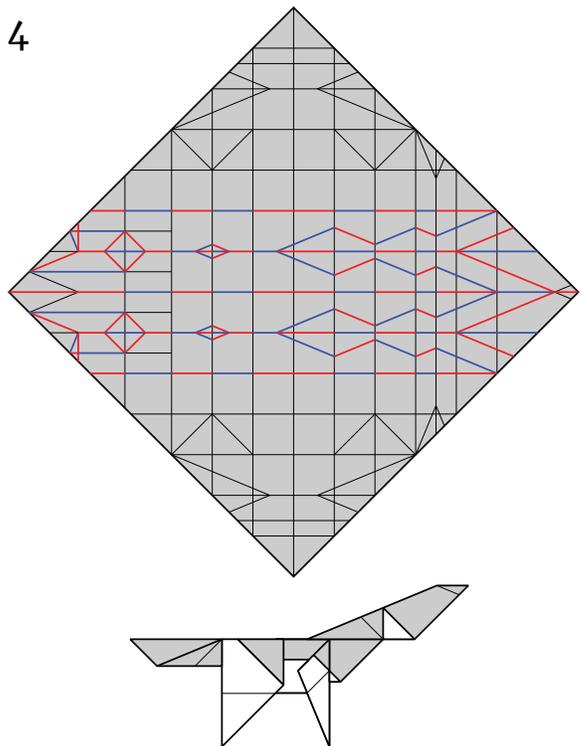
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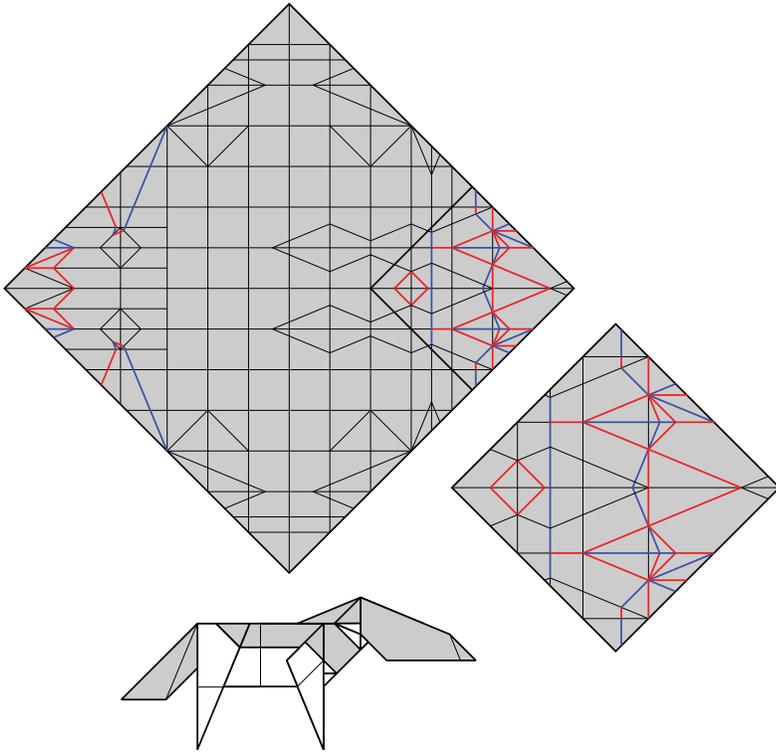
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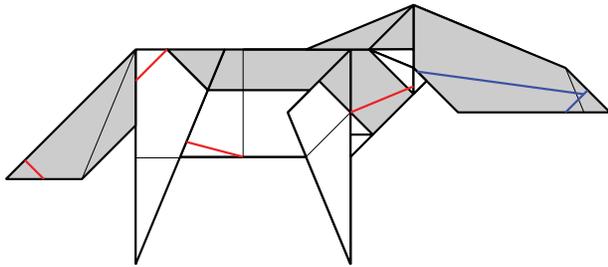


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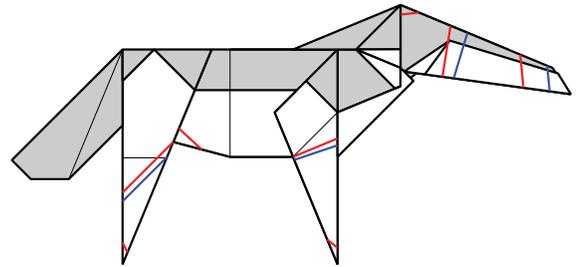


# Shaping

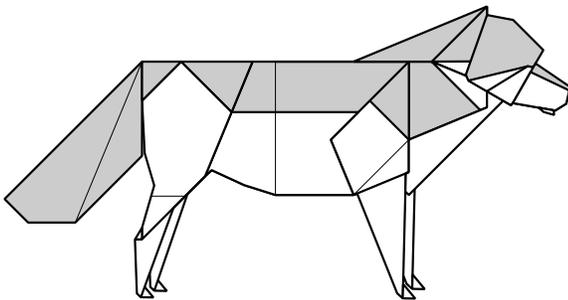
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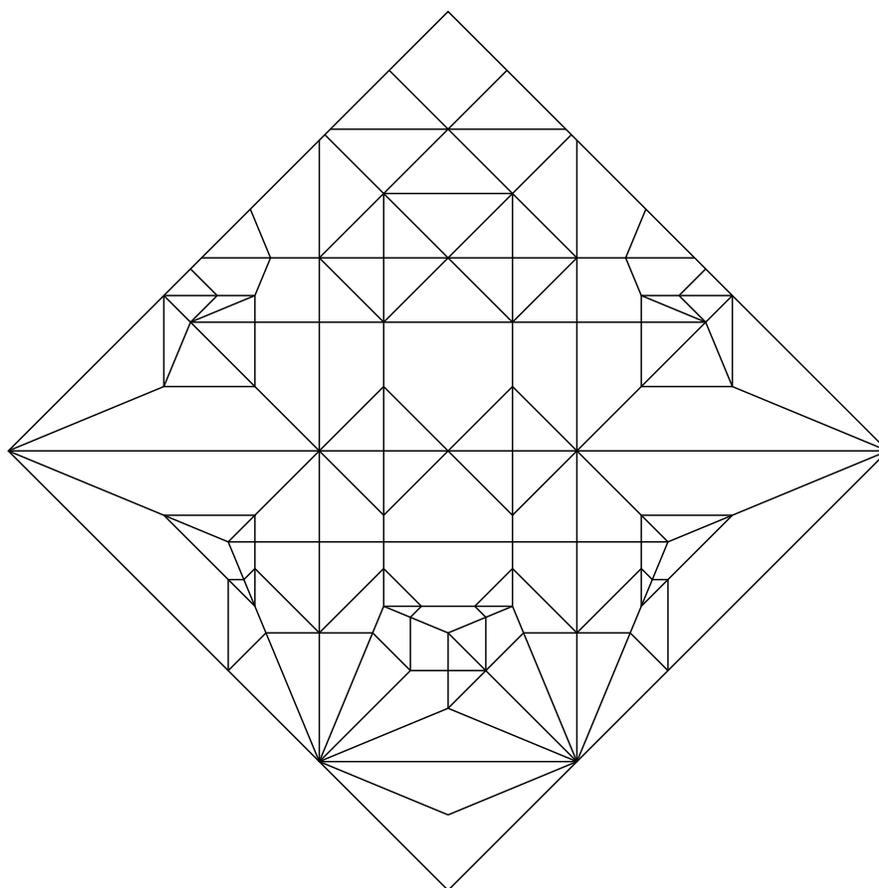
# Orangutan

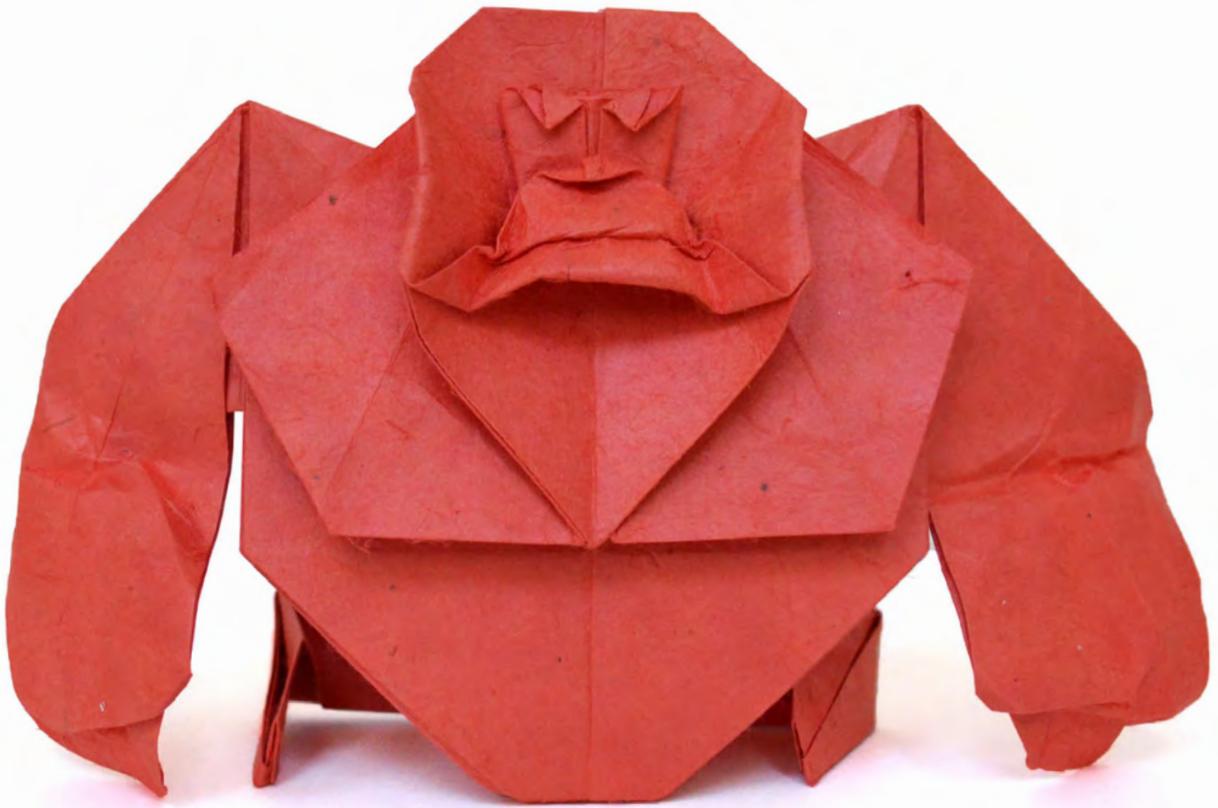
2020

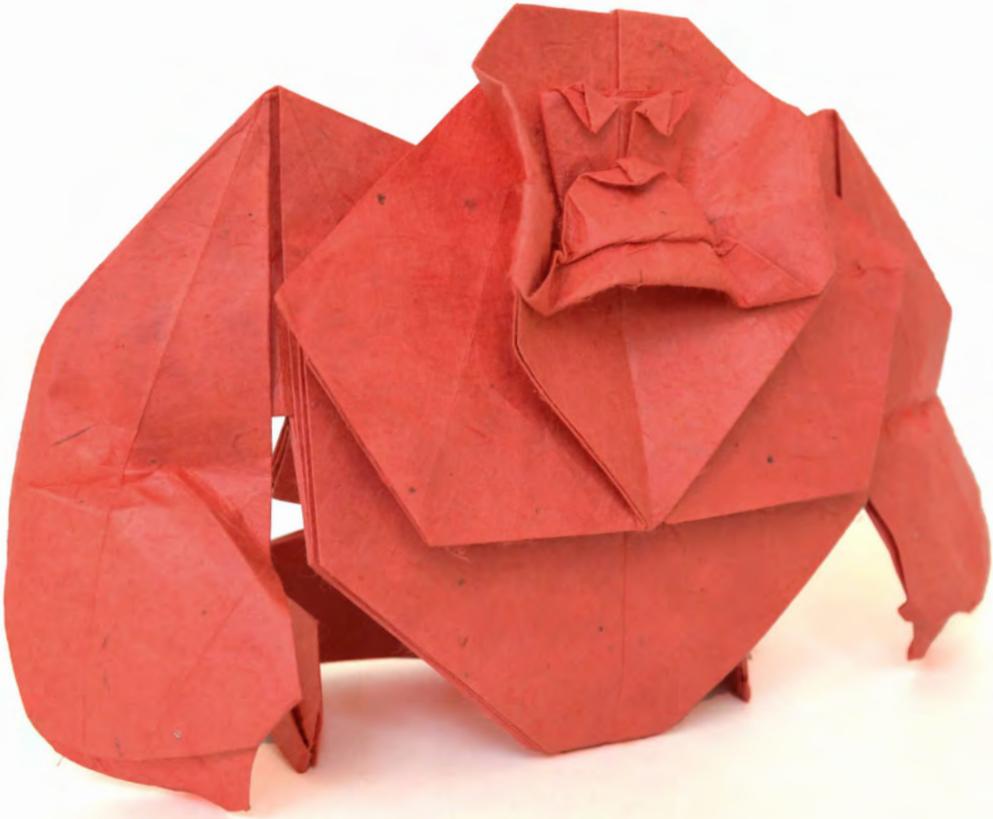
Lama Li Lokta Paper

7.5 in × 4.5 in × 2 in

There are some subjects that are challenging due to the wide variety of forms and details that can be selected by the designer. The orangutan is one of those subjects. After testing various shaping details, I settled on the male version because the head structure naturally formed a triangle at the neck area for the throat sac, and the head flaps could be shaped outwards to form the wide cheek pads. The arm flaps were subsequently arranged to maximize the surface area. One of the strengths of this piece is the ability to express different features in a hierarchy of layers—the head and neck layer is positioned atop the chest layer, which looks as if it is hovering over the main body layer. This layering improves the three dimensional appearance of the frontal face which is so critical in this specific model.



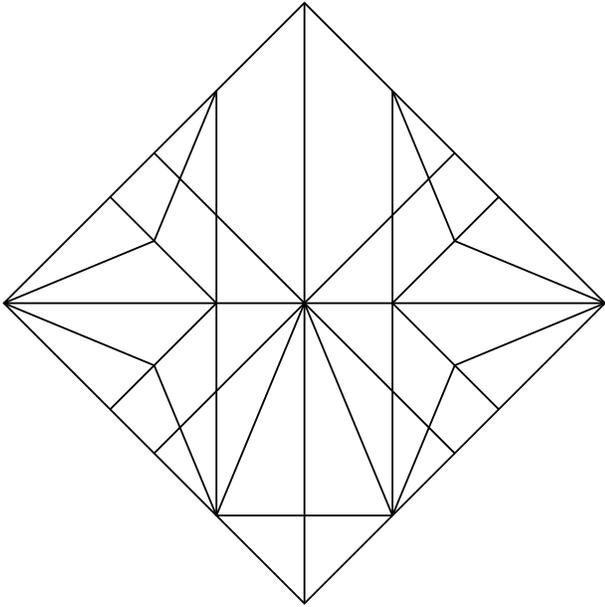




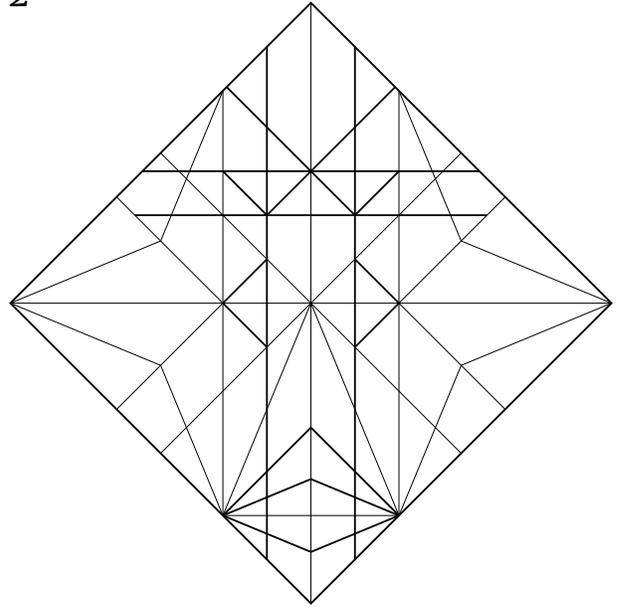


Precrease

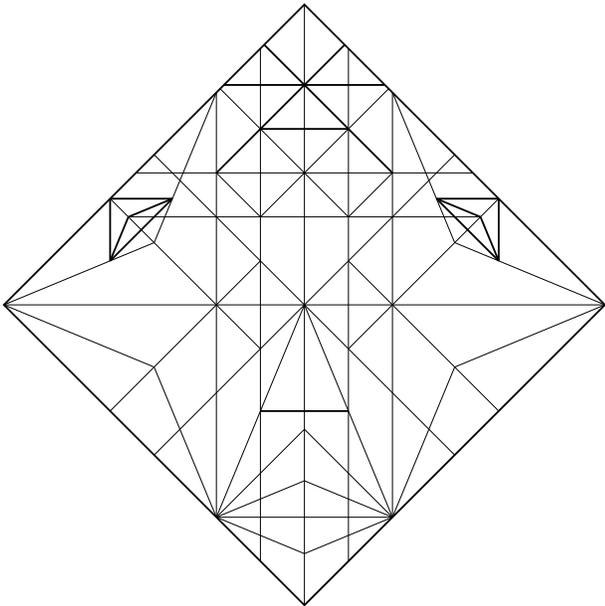
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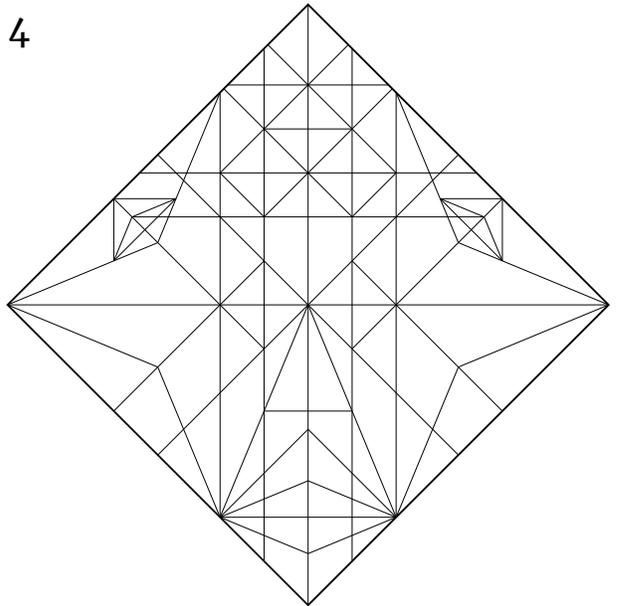
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3

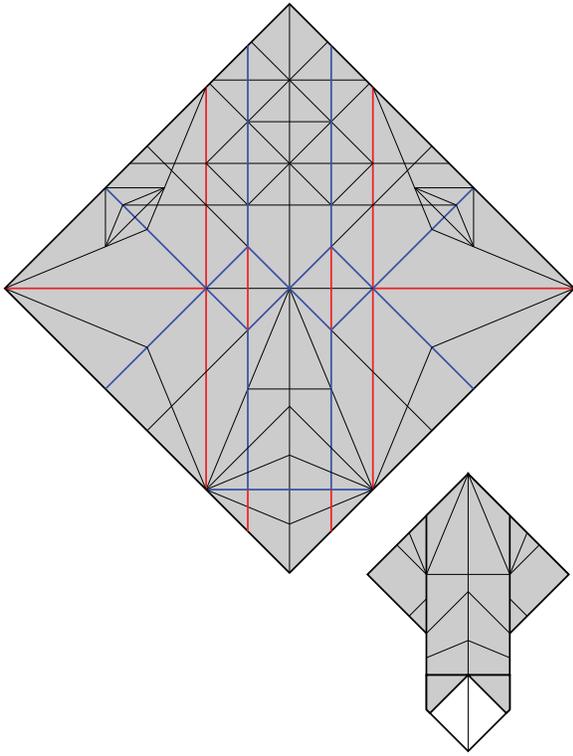


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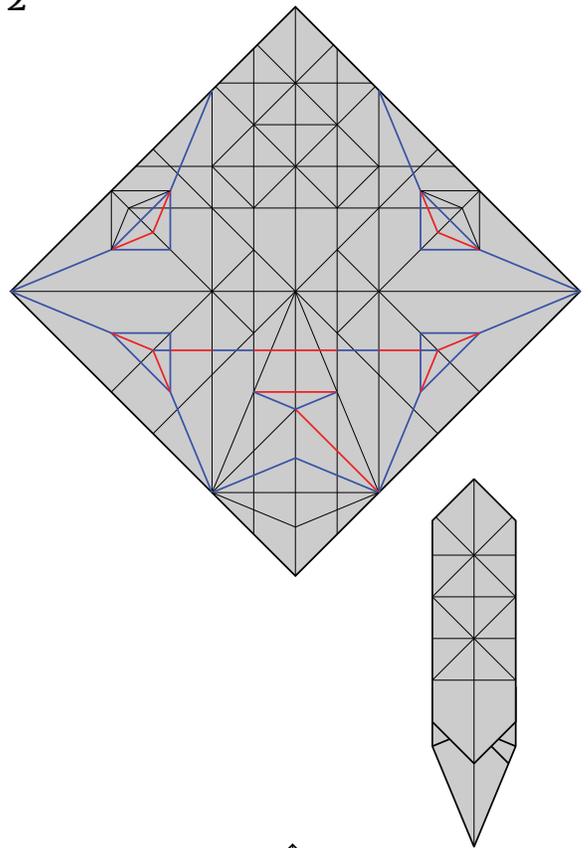


# Collapse

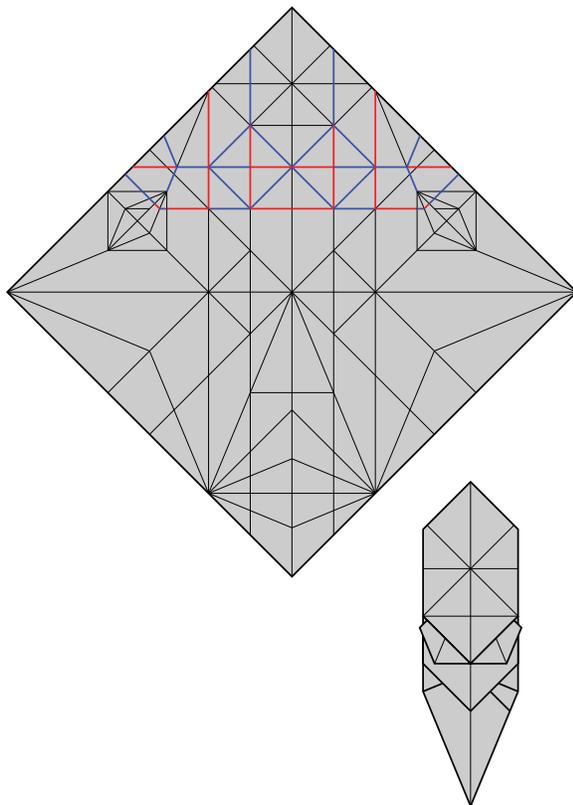
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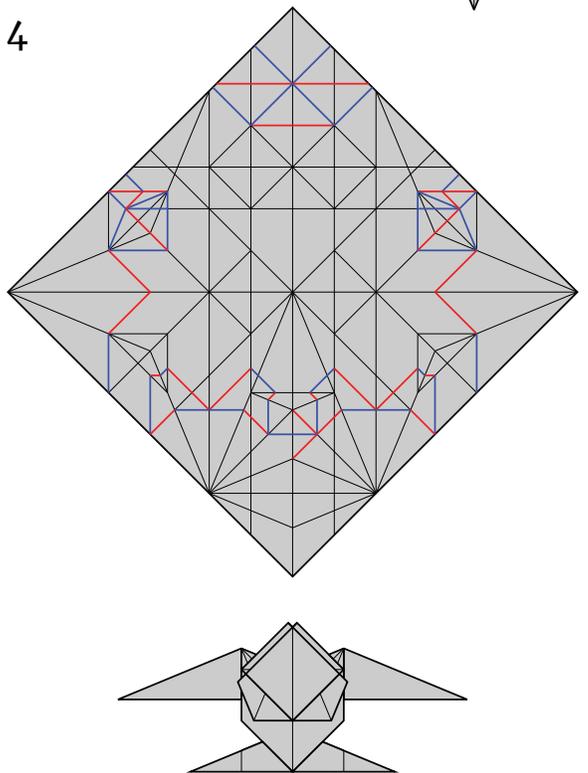
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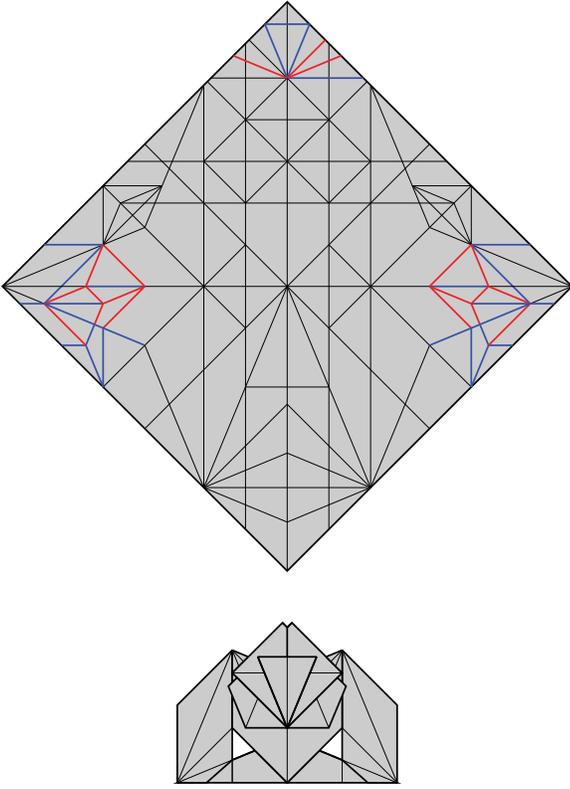
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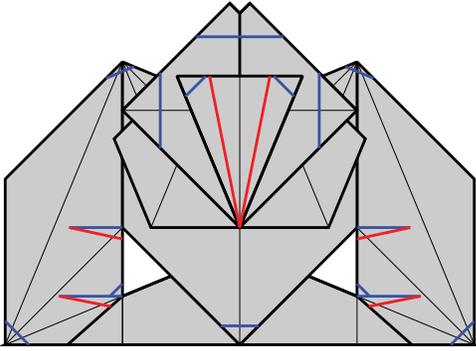


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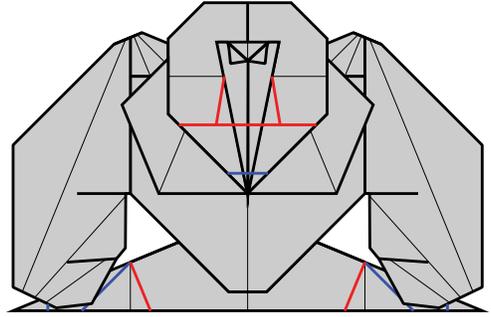


## Shaping

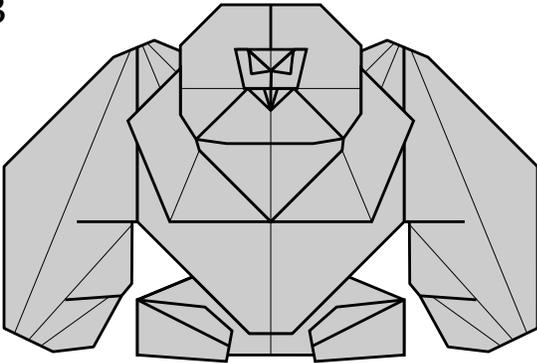
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2



3



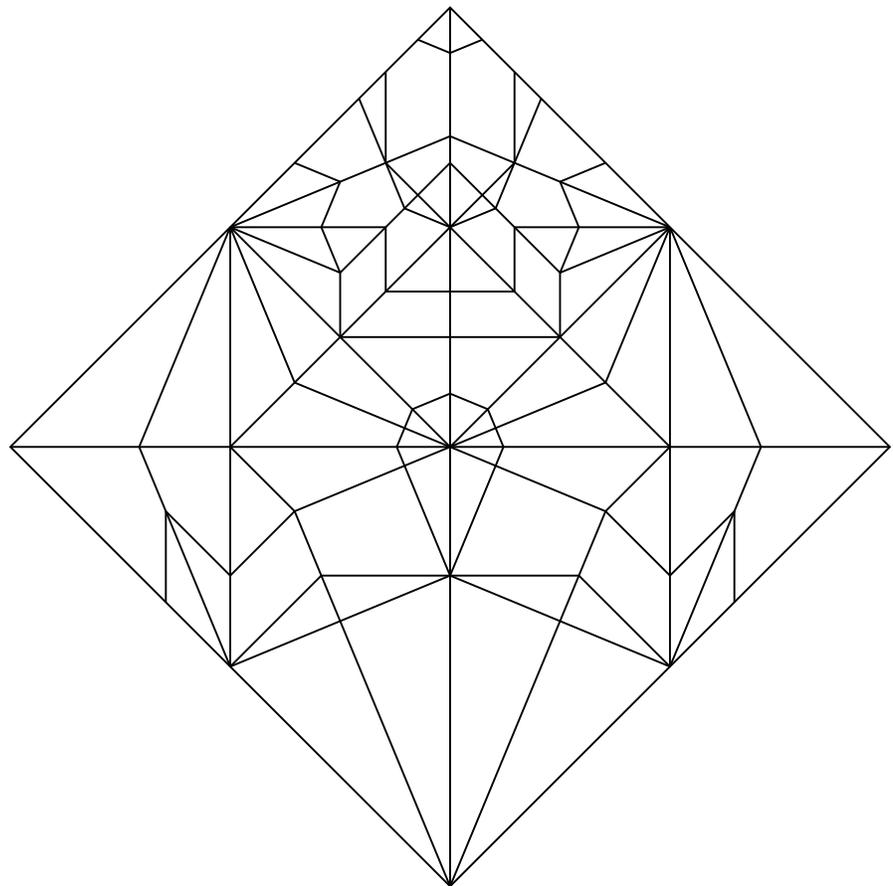
# Dragon

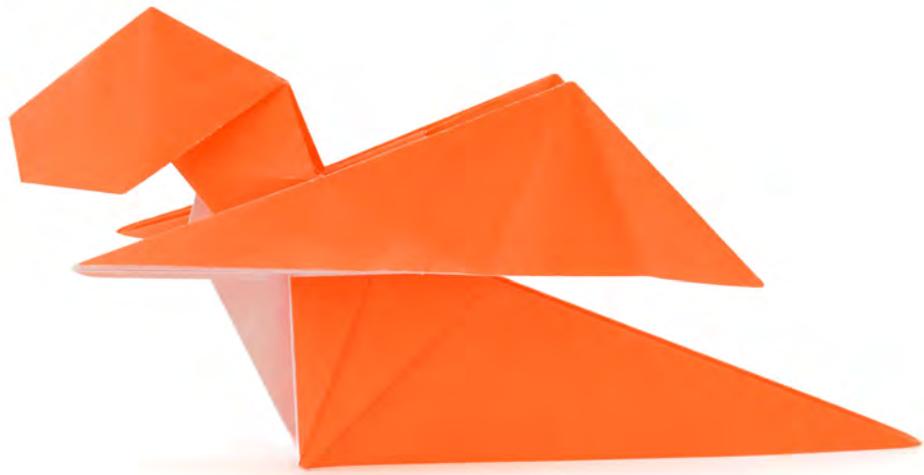
2018

Kami paper

4 in × 2.5 in × 1 in

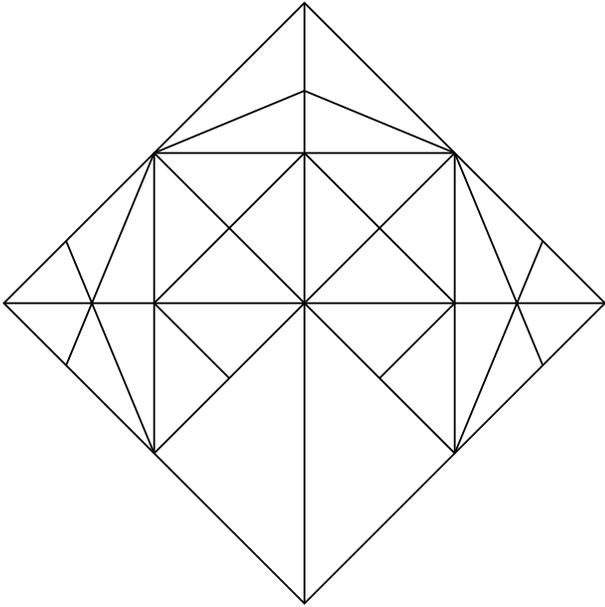
The dragon is a beautiful and successful example of simplicity. The design simplifies the dragon form, combining the tail and hind leg, and the wing and arm with  $22.5^\circ$  shapes. The parallel horizontal lines and slight forward lean cultivate a sense of motion. The white abdomen section adds an interesting color change. In addition, the model is a delight to fold. A straightforward precrease is followed by a series of multi-crease collapses, resulting in minimal shaping. The dragon remains one of my most successful simplistic designs.



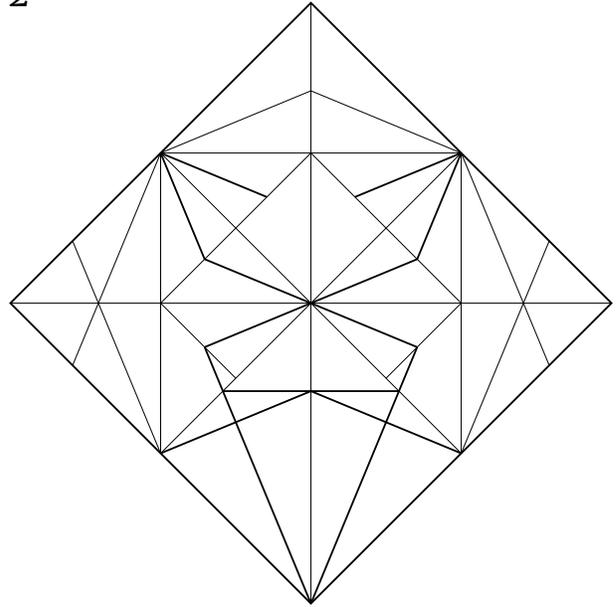


Precrease

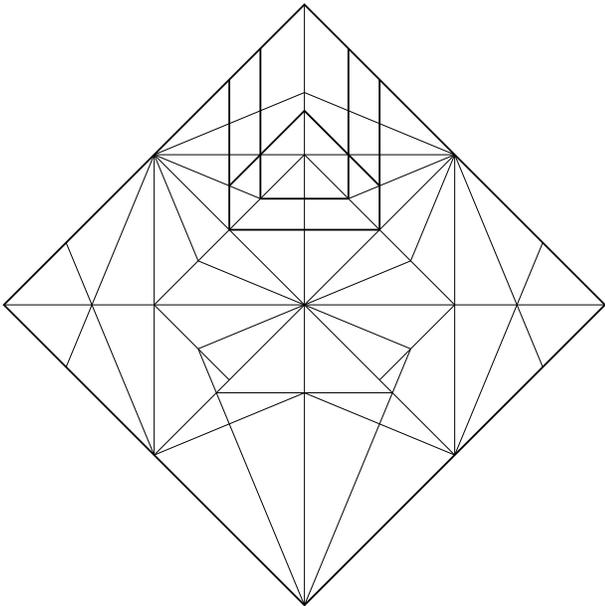
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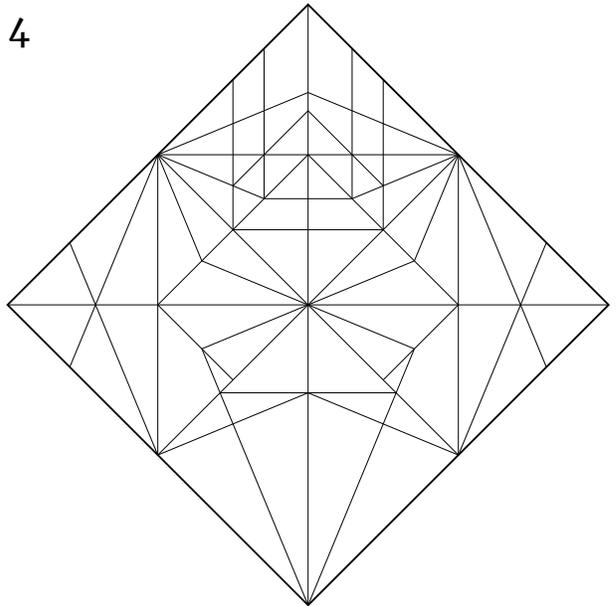
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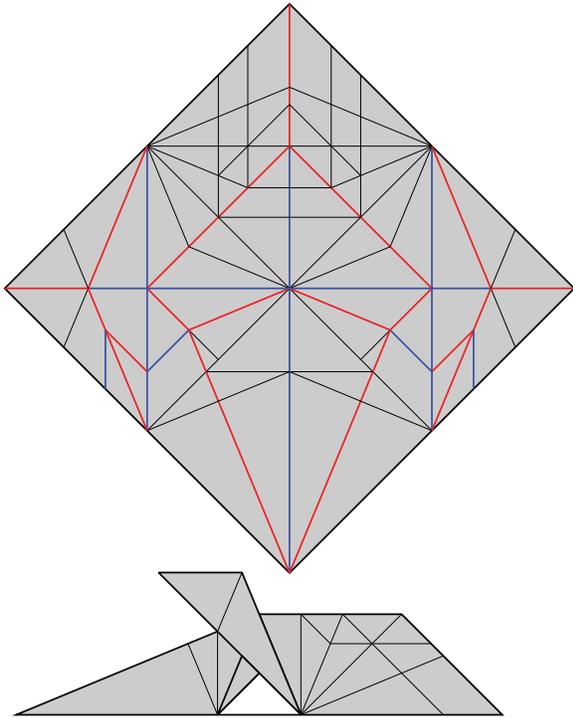


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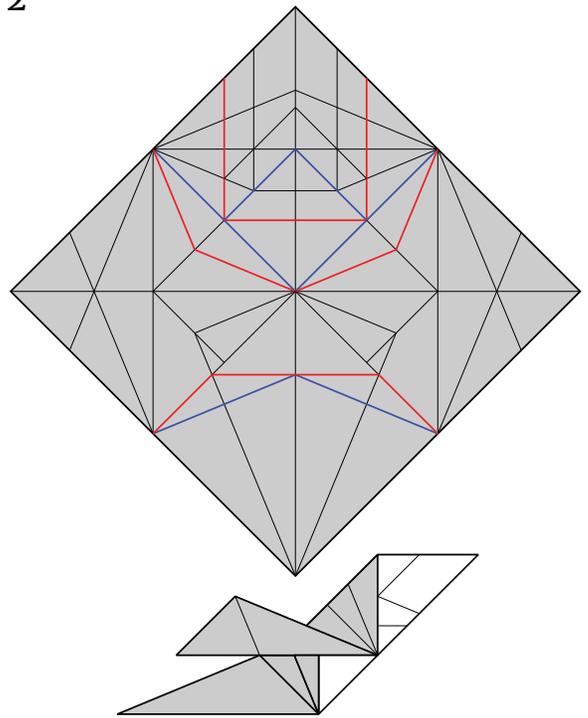


# Collapse

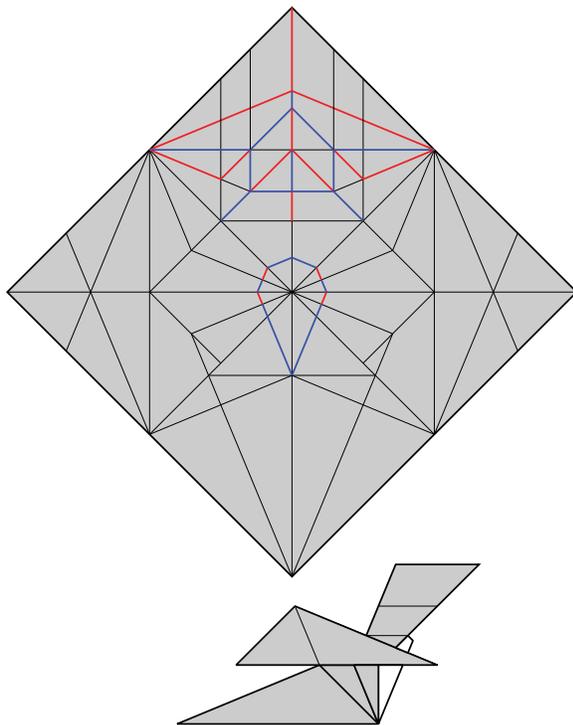
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2

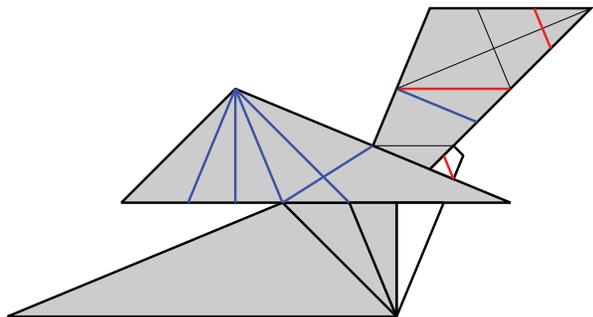


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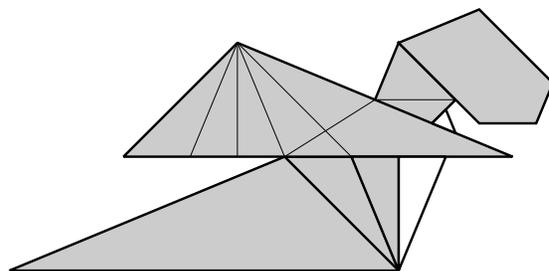


## Shaping

1



2



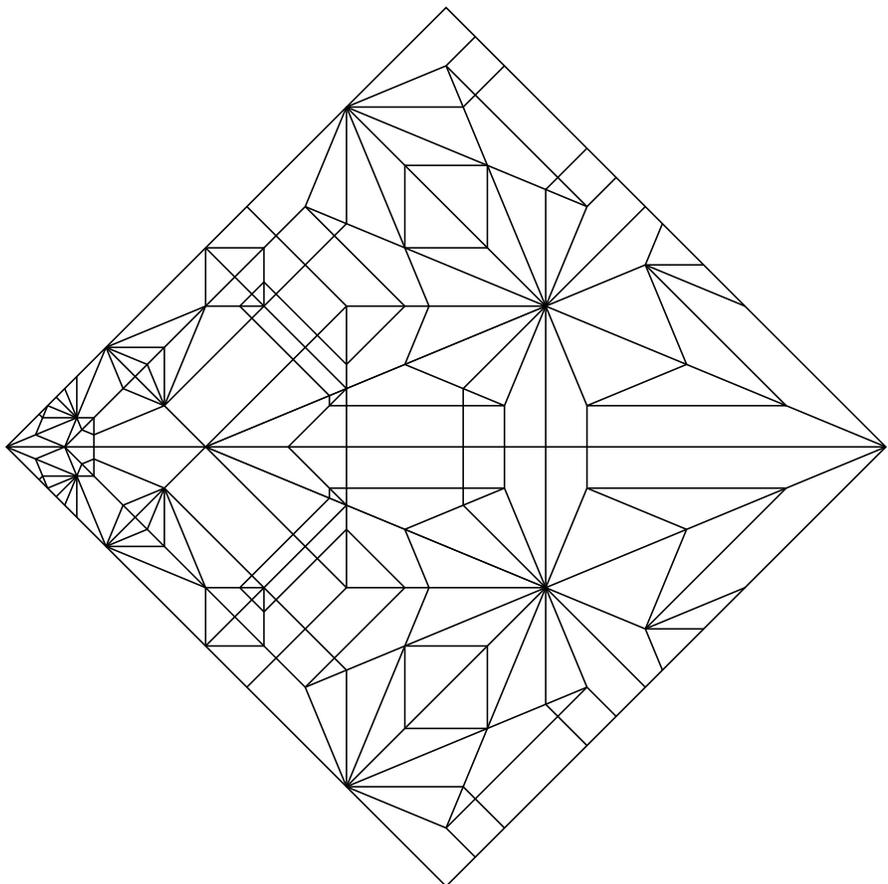


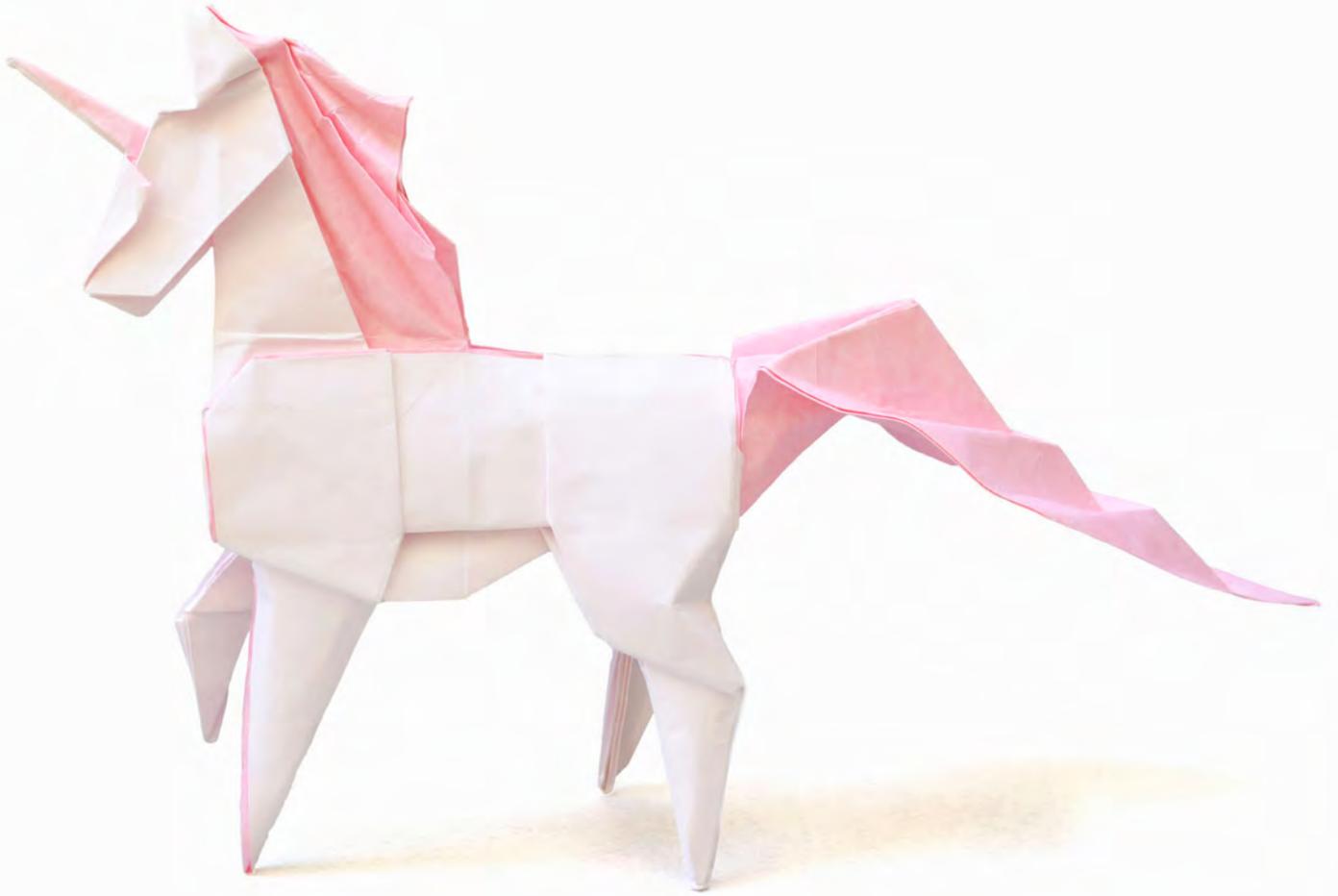
# Unicorn

2020  
Tant & Tissue Paper  
14 in × 9.5 in × 3 in

In an impressive display of simple  $22.5^\circ$  shapes and color change technique, the unicorn emanates a commanding, but majestic quality. My objective was to design a piece with a clean body structure in  $22.5^\circ$  style, like the horse, that is then enhanced by the free-flowing mane and tail.

While similar in visual structure to the horse, the unicorn utilizes an entirely different base to enable the color change. The model begins with a simple kite base. The sides are folded to create  $2 \times 1$  rectangles for the structure of the body. After collapsing the body, the tail layer is manipulated to expose the colored side.



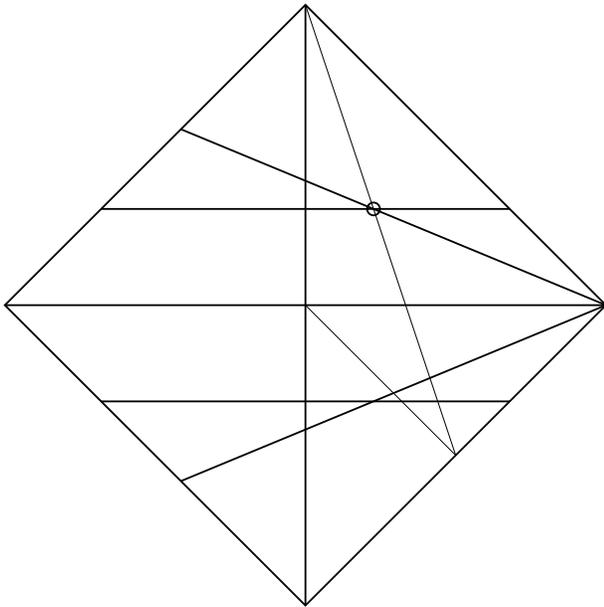




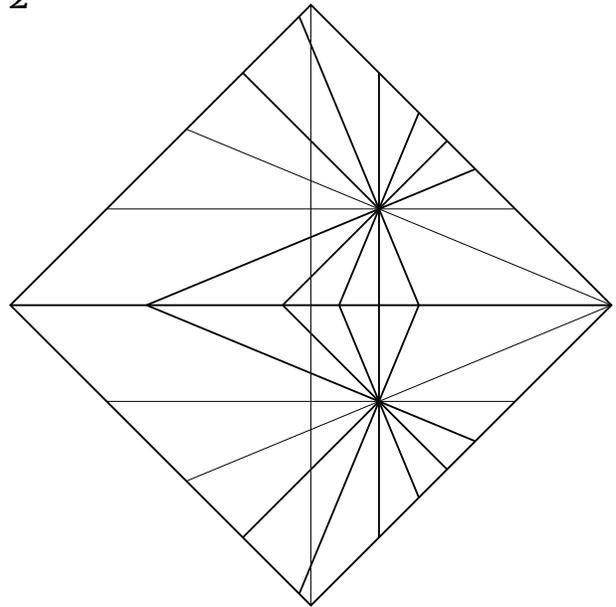


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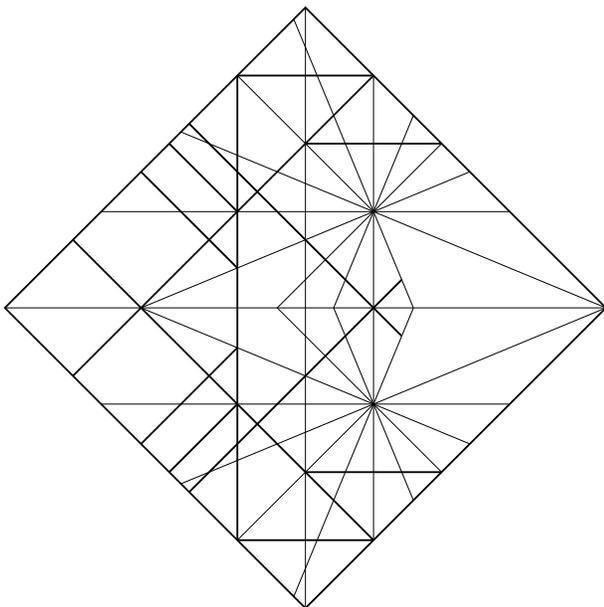
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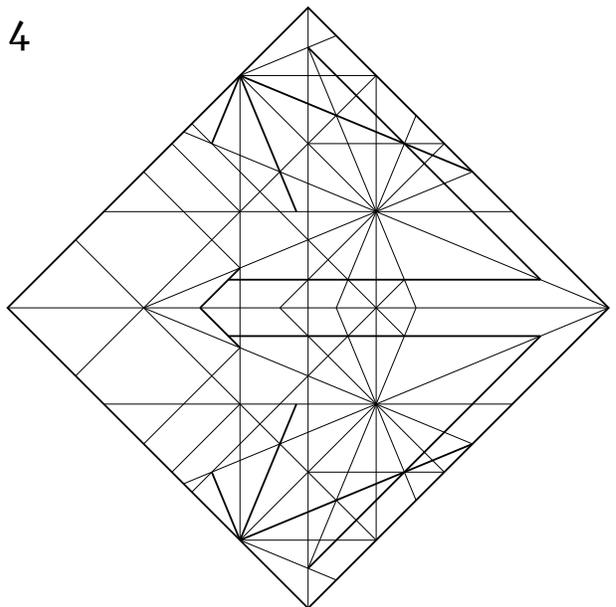
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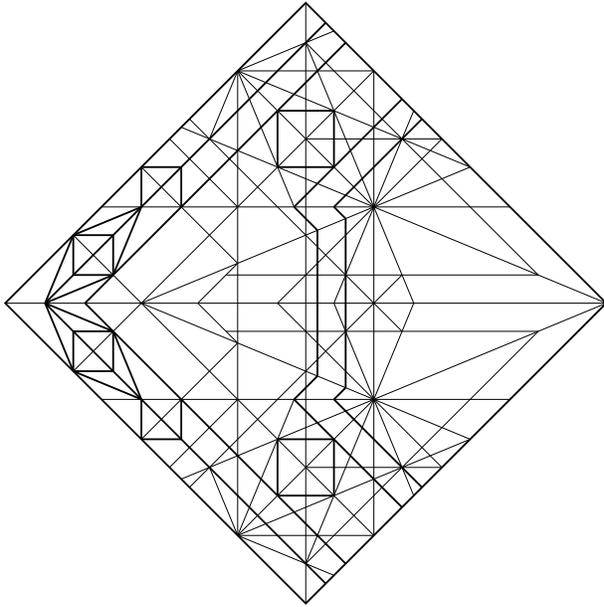
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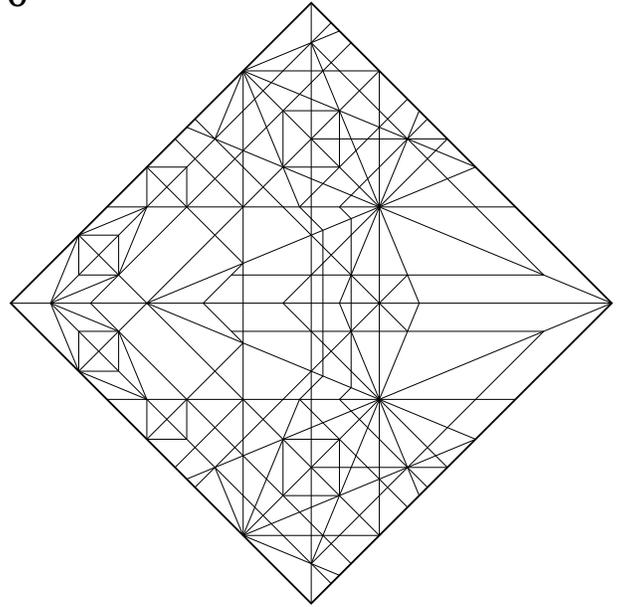
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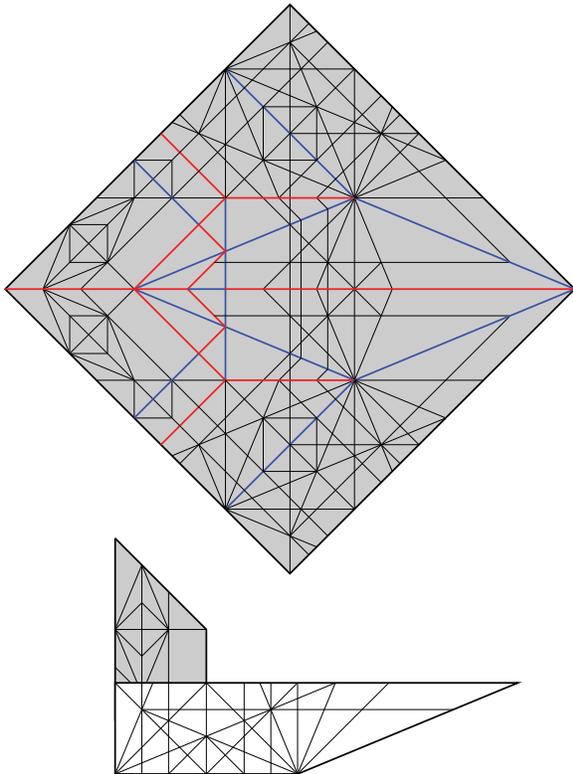


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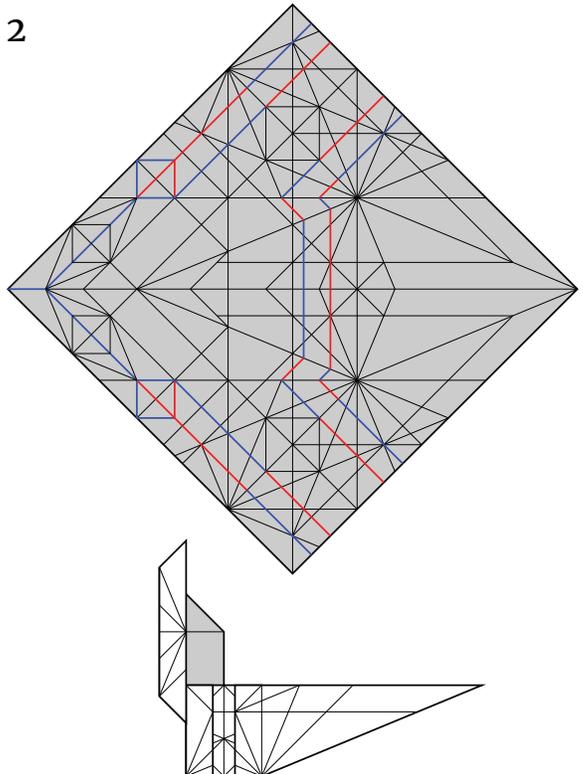


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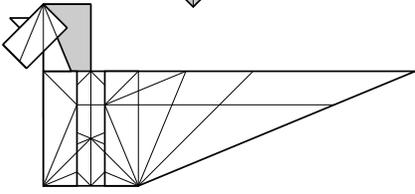
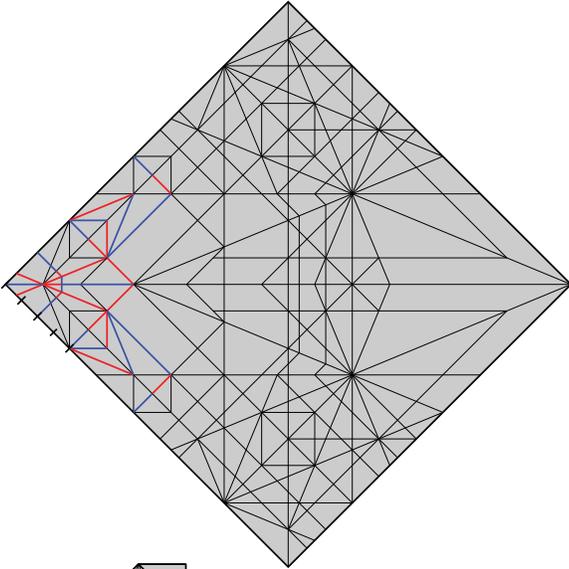
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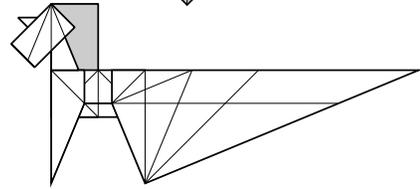
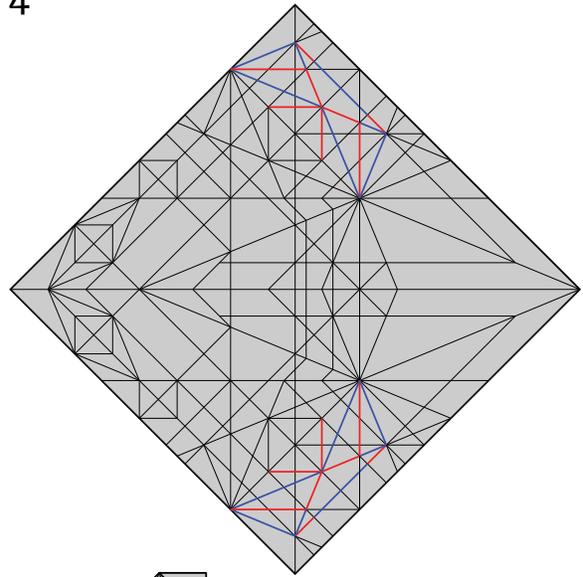
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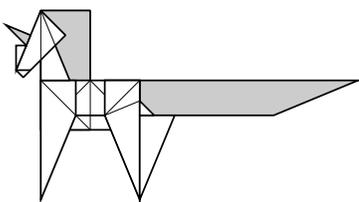
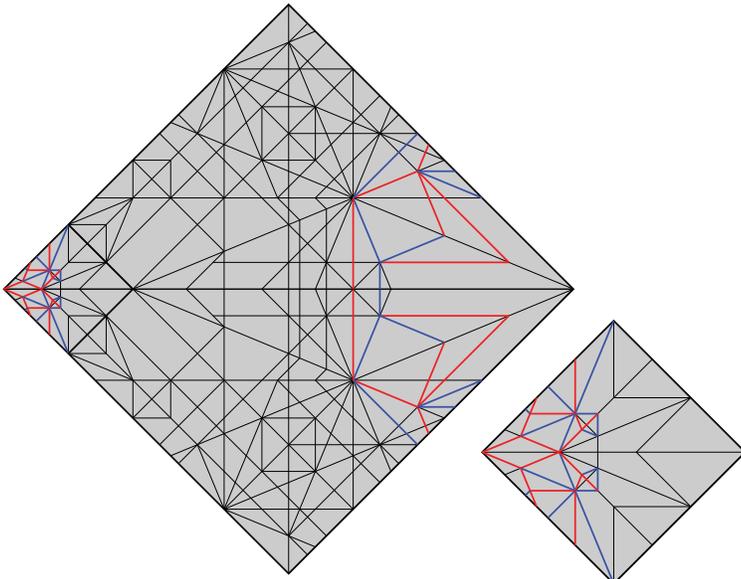
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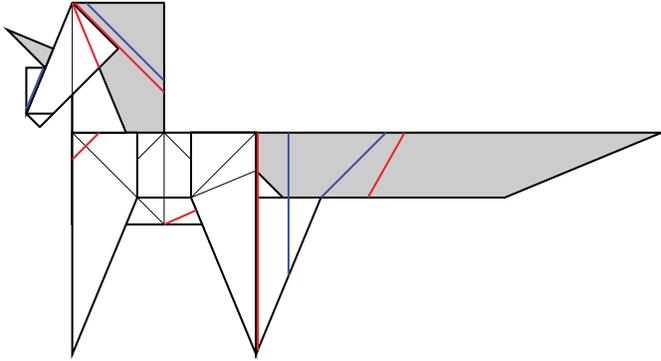


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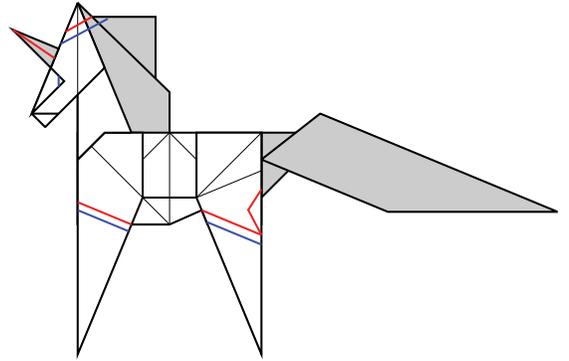


## Shaping

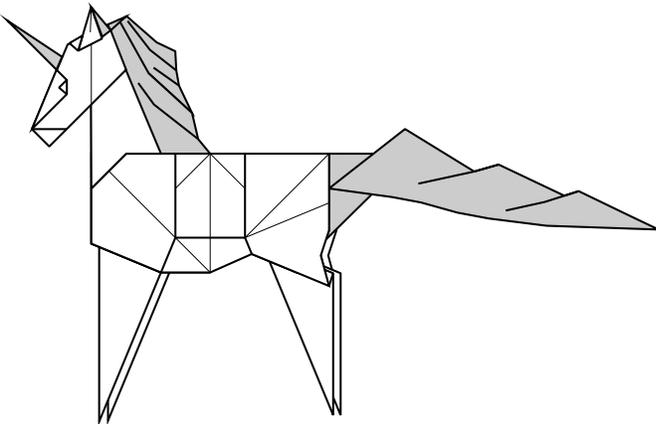
1



2



3





## About the Author

Joseph Hwang is an origami artist from Southern California whose work includes animal designs and modular origami. He enjoys exploring new design concepts and admiring the work of other designers.

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