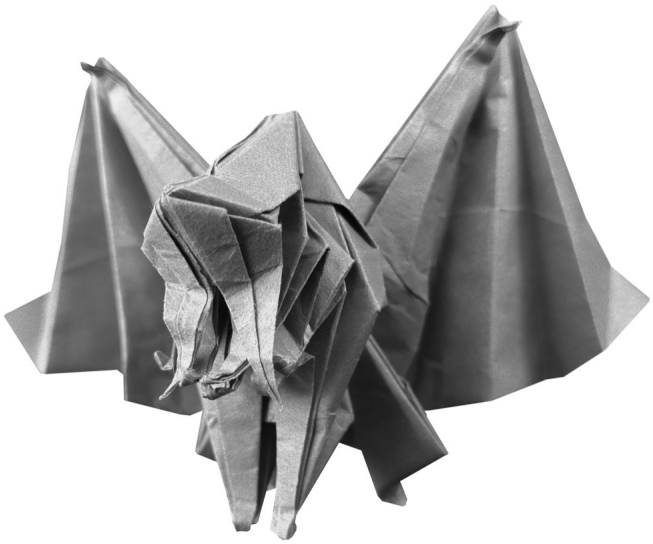
GEEK ORIGAMI

Designed and diagrammed by Miguel F. Romero



GEEK ORIGAMI

Designed and diagrammed by Miguel F. Romero

Geek Origami

Designed and diagrammed by Miguel F. Romero

Mexico City

miferg.origami@gmail.com

This work belongs to Miguel Fernando Romero Gutiérrez. All rights reserved, 2021.

The partial or total reproduction by any means of this work is forbidden. So is the distribution of copies of this book through rent and burrow without previous authorization

ISBN: 978-607-29-3011-7

Aknowledgements

To ozneyer (instagram), origami_lime (instagram), and Alejandro Pinto for reviewing the diagrams in this book prior to their original publication. To Jun Mitani for sharing the ORIPA software, that was used to draw the crease patterns. To Adriana Cassiano for the editorial design of this book, and Rubén Romero for his help in the whole publication process of this book. To Matthew Green for improving the English translation of the text. To Aloha237 (Origami-dan), Lukas Normantas, Ahmad Mohammad, Ision Yadav, and Niels Miño for their help reviewing the English translations of the diagrams.

Contents

Introduction
Where to start....3
Folds reference....6
Gallery....10
Instructions
- Hummingbird....15
- *Velociraptor*....23
- *Therizinosaurus*....35
- *Cryolophosaurus*....51
- Axolotl....63
- Tardigrade....75
- Bacteriophage....86
- Ninja....94
- Quetzalcoatl....111
- Cthulhu....126

Introduction

Defining origami

Origami is the ancient art of paper folding. Even though it appeared independently in various places around the world, the Japanese technique is the most widely used thanks to the work of Akira Yoshizawa.

This art is constantly evolving, not only in its new design techniques, but also in how it is taught and exhibited. For example, nowadays there has been a rapid increase of the number of origami folders thanks to the instructional videos that are being uploaded in various social networks. Additionally, many techniques and principles of this art are being used in scientific research and technological applications. Many people say that today is the best moment to do origami in all its history since its creation.

Some creators, myself included, insist that origami should only be about figures folded from a single uncut square of paper. Naturally, the use of scissors and glue should not be included during the folding process. In fact, there is a term in Japanese that refers to this kind of paper folding:

不切正方形一枚折

(*fu setsu sho ho kei ichi mai ori*), meaning “fold a single uncut square sheet.” This rules force the artist to deal with issues related to the number of flaps required to represent the subject and also make an efficient use of the paper. These factors put the design and folding skills of the artist to the test. The use of cuts along with the folds to make a figure is known as “*kirigami*”, while the assembly of various folded modules into a more complex figure is called “modular origami”. Thus, this book only contains origami *sensu stricto*, which in the current opinion of the author is a more interesting endeavor than kirigami or modular origami.

Beyond the paper crane

Any object can be represented using figurative origami, from simple objects such as the traditional water bomb, to complete fantasy scenarios such as Brian Chan's "Attack of the Kraken." However, the most recurrent theme of origami models is the animal kingdom, especially arthropods, which represent a huge challenge because of their numerous appendages and thin bodies. Another recurrent theme nowadays is fish, which also have a large variety of forms. Nonetheless, the themes that fall into the interest of the author of this book are those related to fantasy and science fiction, that are not new subjects in origami, as the several-decades-old Star Wars vehicles designed by Philip Schultz are able to testify.

This publication displays the author's view of origami, which holds that origami, in is purest form (i.e. 不切正方形一枚折), should be used to recreate not only fantastic beings that inhabit popular culture, but also real life subjects, which are as interesting as the former. This is why this book includes the instructions to fold the high priest of the ancients, a water bear, and the feathered serpent. This work is also recognizes that sharing is as important as creating origami.

On the shoulders of giants

The author would also like to acknowledge all origami artists who have shared their knowledge and art with the rest of us. It is because of them that origami is an enjoyable and nourishing discipline. Special thanks to those who have been the most important references and sources of inspiration for the creation of this book: John Montroll, J. Aníbal Voyer, Charles Esseltine, Stephen O'Hanlon, Issei Yoshino, Satoshi Kamiya, and Robert Lang.

Where to start

Learn to read diagrams

The instructional diagrams contained in this book illustrate the paper being folded and employ some signals such as lines and arrows that guide the folding process. Frequently, origami diagrams show a sheet of paper that has a different color on each side. Although the models can be folded with a single colored sheet of paper, the assignment of a different color to each side of the paper in the diagrams is useful because makes it clear which side of the paper is being shown. This also ensures that the instructions are being interpreted correctly.

Another key element in origami diagrams are the dashed lines. Dashed lines indicate valley folds, and lines with dashes and dots indicate mountain folds. Virtually every maneuver needed to fold an origami figure can be represented using combinations of this two line types. Yet, there are several composite procedures, such as swivels and sinks, that are recurrent enough to be indicated by special names and symbols.

Skipping steps

Besides the step-by-step diagrams, this work includes crease patterns, which are maps that show the square sheet of paper marked with lines, generally of two types. When these lines are translated to mountain and valley folds at the same time in a sheet of paper, the collapsed figure should form the base structure of the corresponding model.

Getting used to decoding crease patterns requires a difficult initial learning process, but it is a truly convenient skill because there is a large number of models in the origami literature that cannot be represented by a step-by-step instruction diagram with a reasonable length and complexity. On the other hand, there are some origami models for which it is not useful to draw a crease pattern.

The paper is important

The paper used to fold an origami figure will significantly impact the difficulty of the folding process and its final appearance. Using thin paper is useful when folding complex figures but the model will likely end up being weak and floppy. Using thicker paper with sophisticated textures will let you fold only simple models, although the texture will add to the final look of the model.

In my experience, a very versatile and cost-effective alternative is hand-made tissue foil paper: it is relatively thin, robust and easy to shape. This paper is made simply by pasting a single layer of tissue paper over a sheet of aluminum foil using multipurpose glue. This lets you fold sturdy and detailed figures. Making this kind of paper is an art in and of itself and demands lots of practice and individual experimentation.

Another paper that is extensively used to fold origami models is double tissue foil, that is like tissue foil but with a sheet of tissue paper on each side of the aluminum foil. Even though this paper is thicker than tissue foil, the second layer of tissue hides the metallic face that would be inappropriate for organic models. This second tissue layer is also convenient for two colored models.

You can find several websites discussing and recommending different types of paper (for example: https://origami.me/paper/). At the end of the day, each folder is free to choose the paper he or she sees fit, even non-conventional materials such as painted paper or plastic film.

Paper size is also important, but it depends heavily on the model and the desired final dimensions. Pay attention to the introduction preceding each diagram for the recommended paper size.

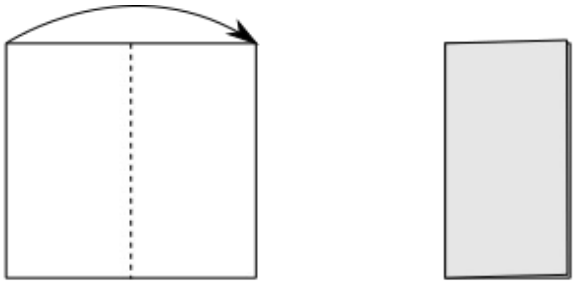
Have fun!

Whether you are a beginner or an experimented origamist, I hope that you enjoy this book as much as I enjoyed designing the models and drawing the instructions. The figures are sorted from simple to complex and most of them should be folded with a single-colored sheet of paper. Many of these figures are tributes to the origami designers that influenced my work and others are related to the culture of Mexico, the country in which I was born.

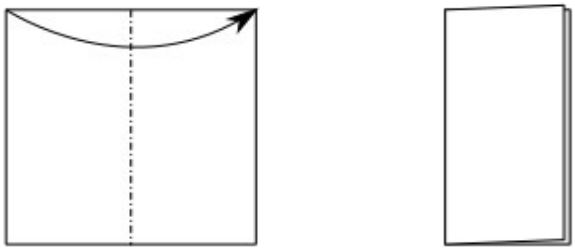
If the diagrams contained in this book are too complicated or intimidating, try folding other simpler diagrams such as the traditional crane and the traditional frog that can be found on the internet. Then you can try intermediate complexity diagrams, and afterwards you will be able to fold these models without problems. If you get stuck when trying to fold these diagrams or if you have any comment, you can write to my email address miferg.origami@gmail.com and I will be happy to help.

Folds reference

Valley fold: It is indicated by a dashed line and is made towards the viewer.

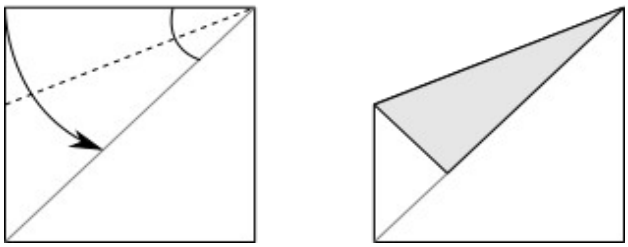


Mountain fold: Specified by a dashed and dotted line, it is made towards the back.

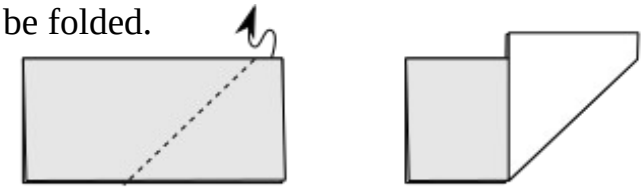


Dotted line: It marks a fold that will be performed on a currently hidden layer.

Fold along the angle bisector: The key element is the black curve spanning the angle to be taken as a reference.

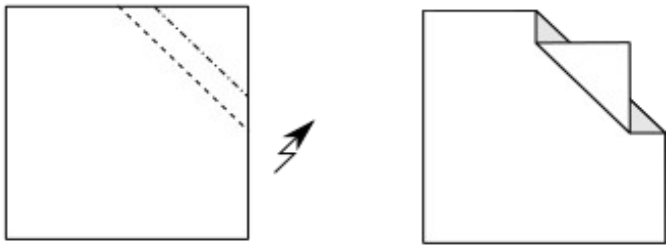


Outside reverse fold: It is specified by a dashed line that is mirrored on the back of the paper being folded. The meandering arrow originates on the edge that will be flipped outwards and points at the direction to which the structure is going to be folded.

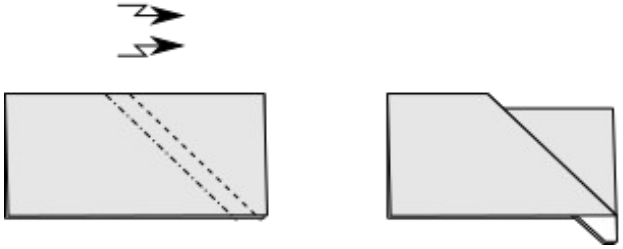


Inside reverse fold: It is similar to an outside reverse fold, but in this case the indicated edge is going to be folded inwards.

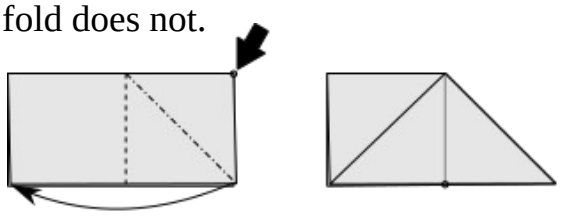
Pleat: Is just a mountain fold followed by a valley fold. It is indicated by the corresponding line types and an elbowed arrow.



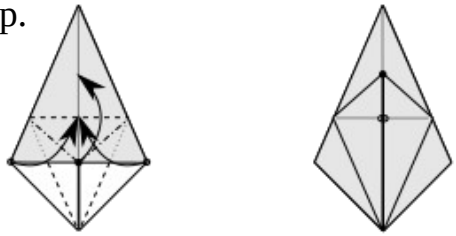
Crimp: A crimp is designated by two elbowed arrows and two consecutive reverse-fold lines. Just do an inside reverse fold and then an outside reverse fold.



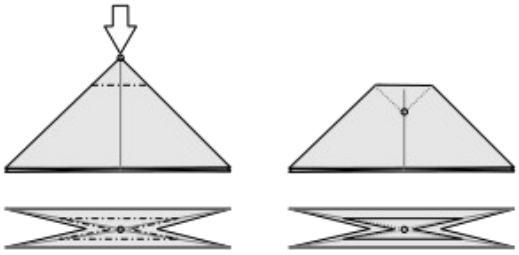
Squash / Swivel fold: It is indicated by a black arrow pointing to a corner (white dot) that will be pressed flat into a central point of the current structure. A squash fold produces a symmetrical shape (as in the example) while the swivel fold does not.



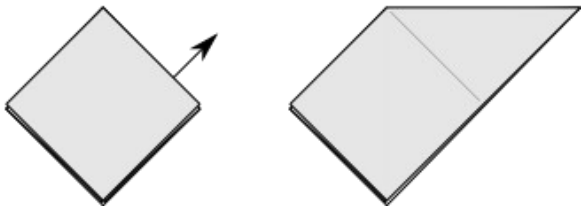
Petal fold: Indicated by several lines and arrows, it is just a fancy name for the process of forming a flap from an edge (marked here with a black dot). Note the corners with the dots that will end up forming aligned edges below the newly-formed flap.



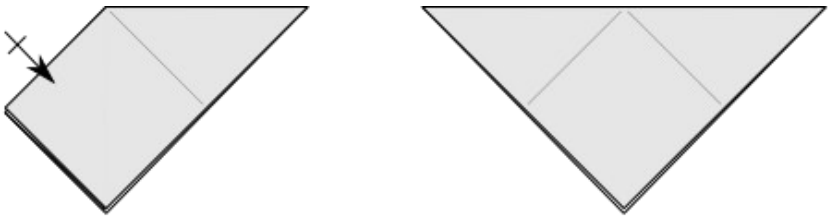
Sink: It is indicated by a white arrow and affects the whole surface of the flap that is going to be sunk. The figures below show the model as seen from above.



Extract: Pull out a layer that is currently hidden. Said layer is marked with an arrow that protrudes from a border.

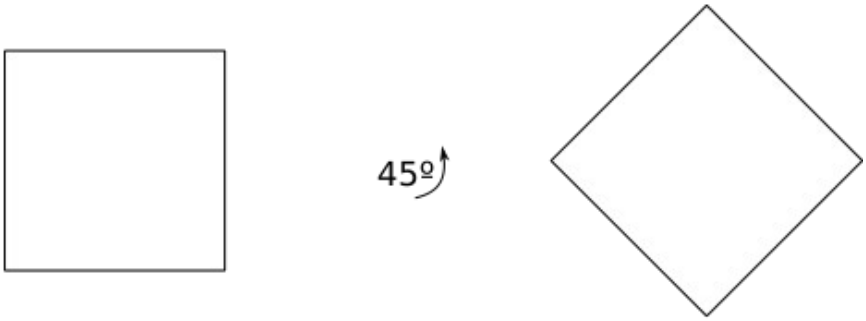


Repeat: Fold again one or more steps on the marked zone with a crossed arrow.



Turn: Turn the figure around or over to show the currently hidden side.

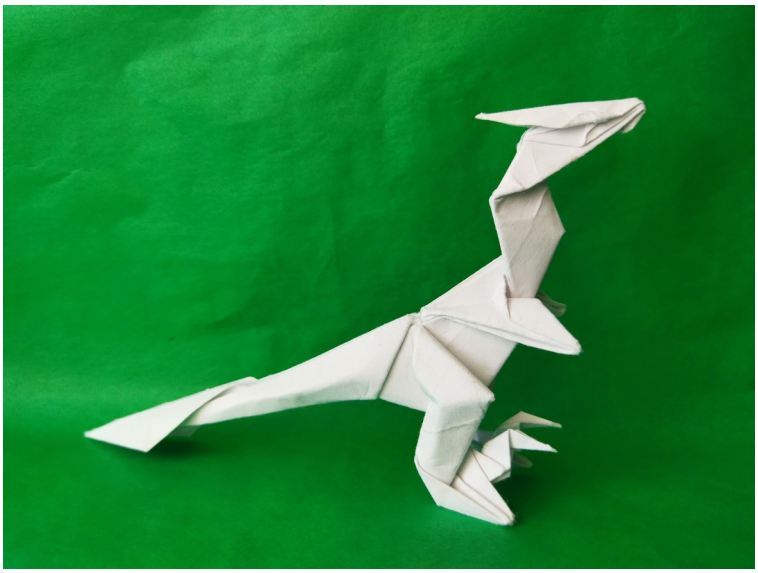
Rotate: Change the angle of the main axis of the figure, keeping the same point of view.



Change point of view: Turn the model where the eye is to see where you should fold.

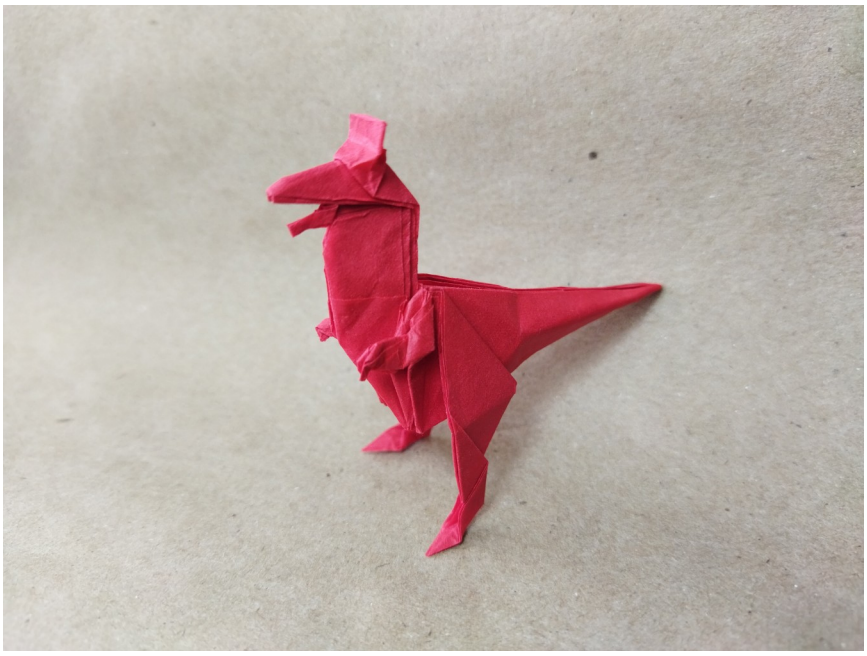
Gallery

Hummingbird

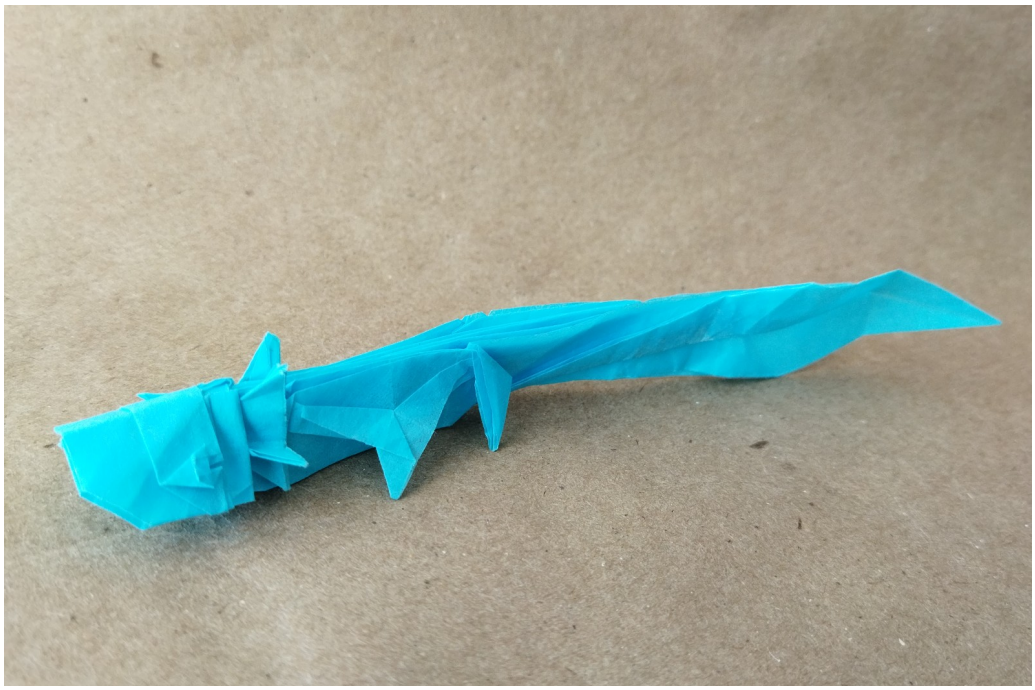


Velociraptor

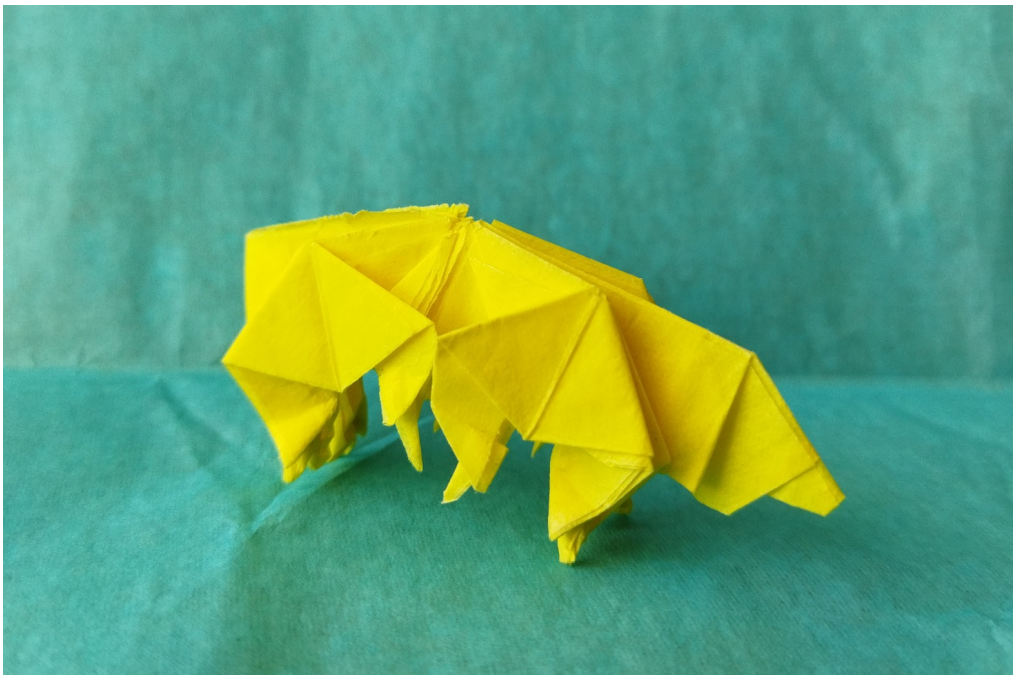
Therizinosaurus



Cryolophosaurus



Axolotl

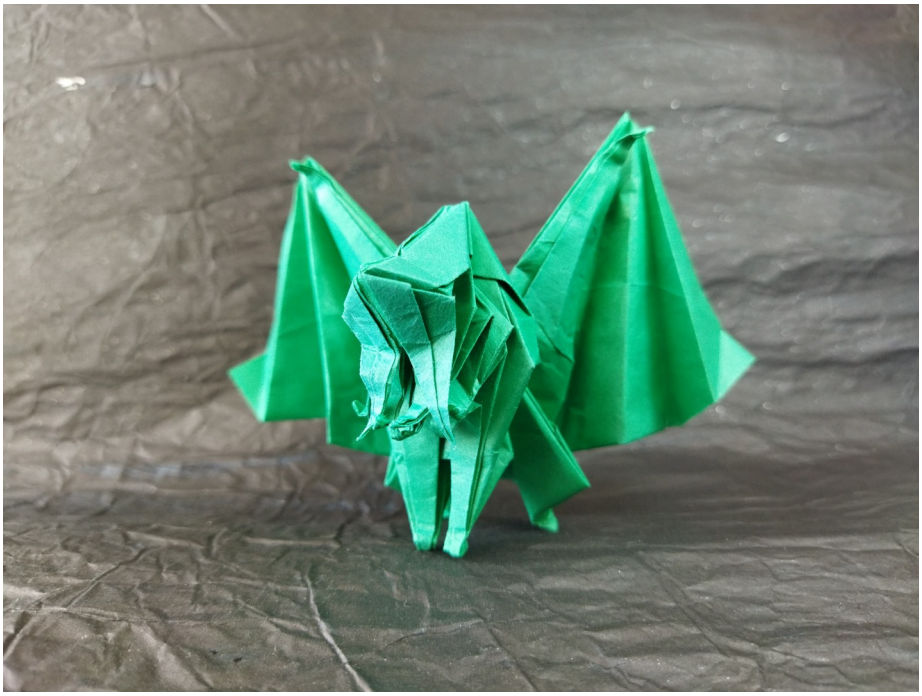


Tardigrade

Bacteriophage

Ninja

Quetzalcoatl

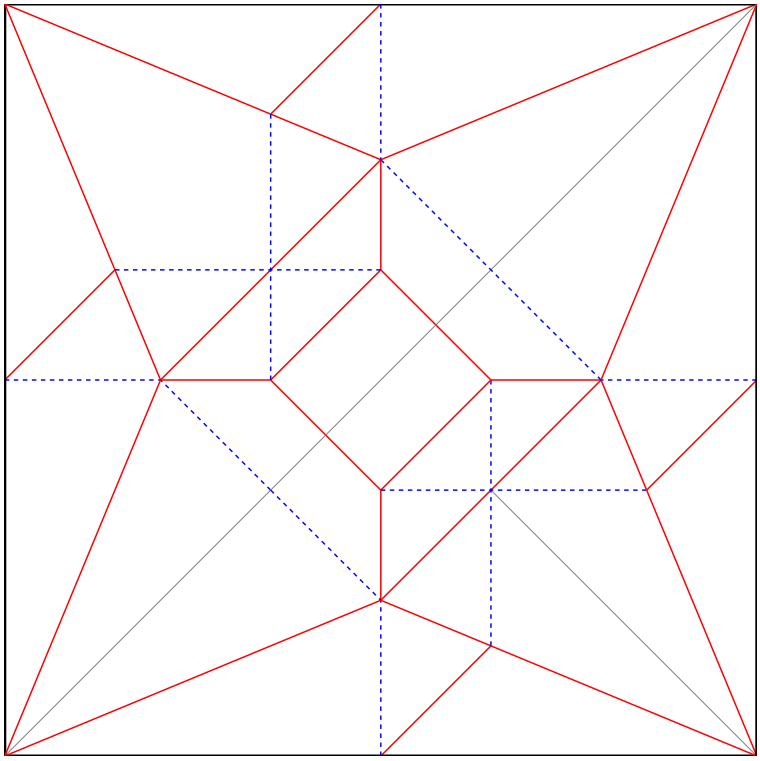


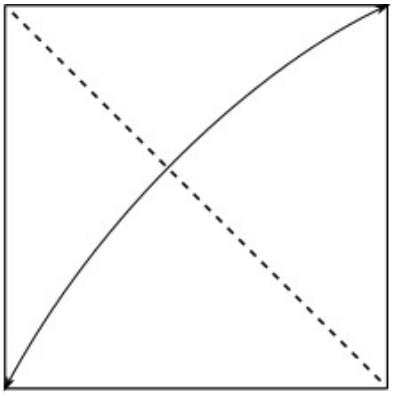
Cthulhu

Hummingbird

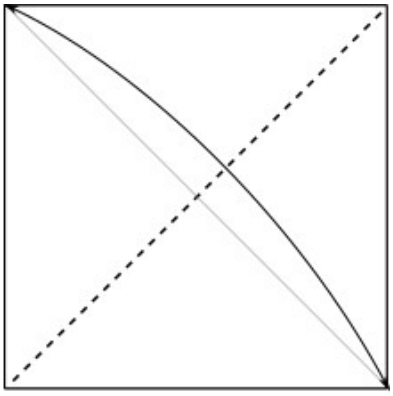
Hummingbirds are those classified in the Trochilidae family, which can be found all around the globe. They measure about 10 cm from beak to tail and they make everyone happy when they fly by, going about their business. Birds, and hummingbirds in particular, are a recurrent subject in origami because they are beautiful and because their body structure that can be easily represented.

The model that you are about to fold is the heir of a design created originally in the year 2010. Said version had a color change in the wings and the beak, as well as a more sophisticated formation of the tail. The version included in this book has been simplified and produces a simpler model, but has its own beauty in its simplicity. The finished model should have similar dimensions to the original paper square. I recommend using any type of paper as it is a very straightforward model. The crease pattern corresponds to folding the instructions up to step 16.

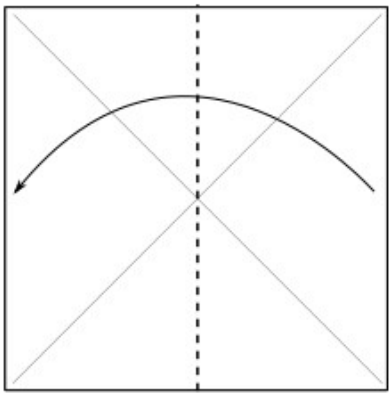




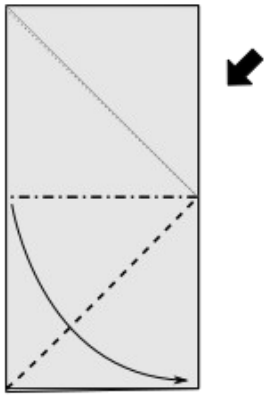
1. Begin with the white side up. Fold and unfold.



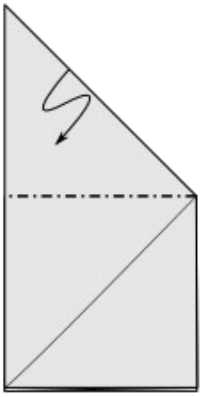
2. Fold and unfold.



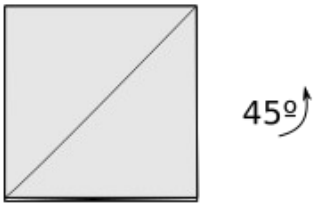
3. Fold in half.



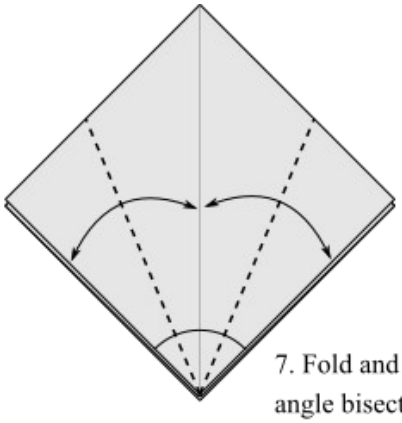
4. Swivel the upper right border.



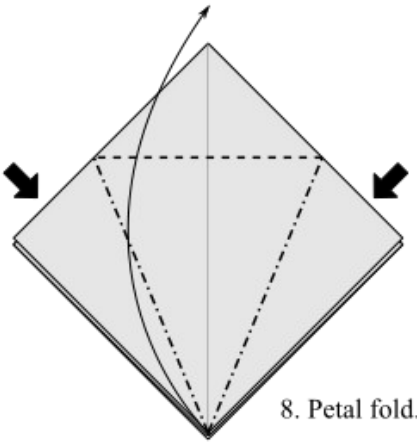
5. Inside reverse fold.



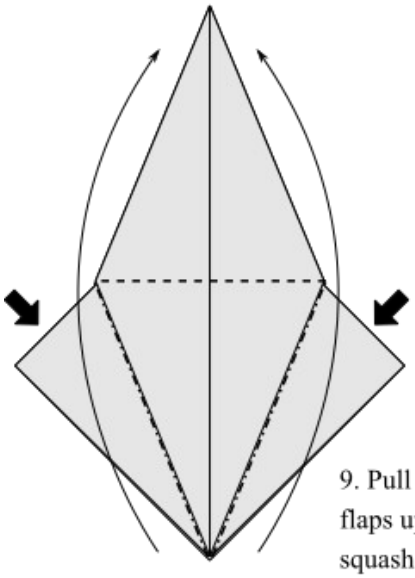
6. Rotate.



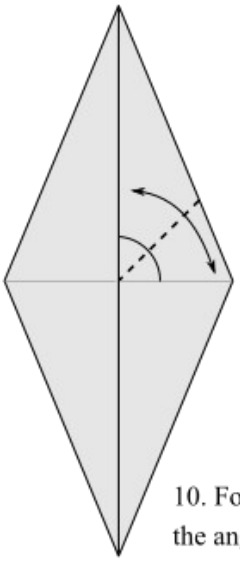
7. Fold and unfold the angle bisectors.



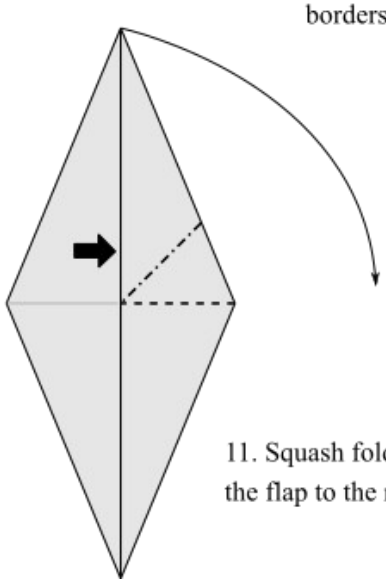
8. Petal fold.



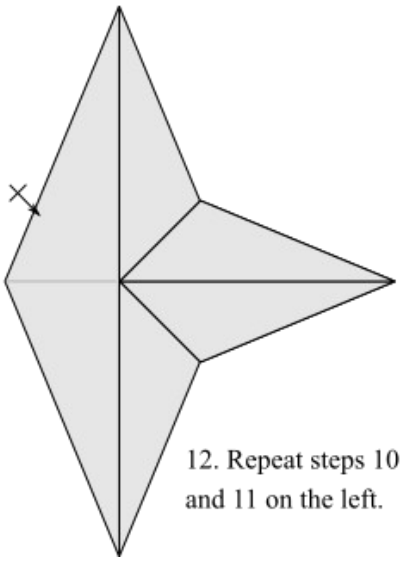
9. Pull both flaps upwards and squash fold the borders.



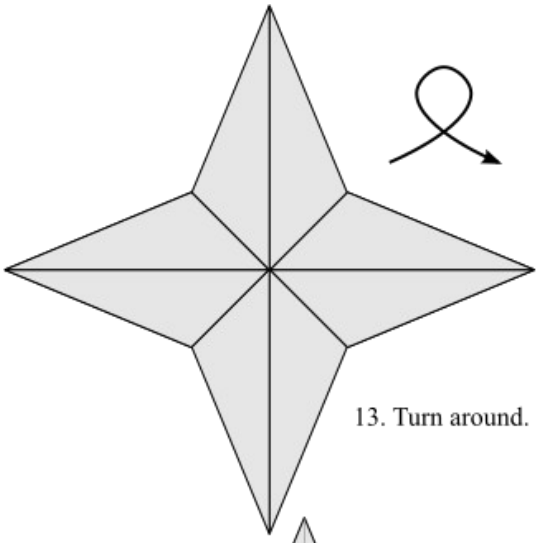
10. Fold and unfold the angle bisector.



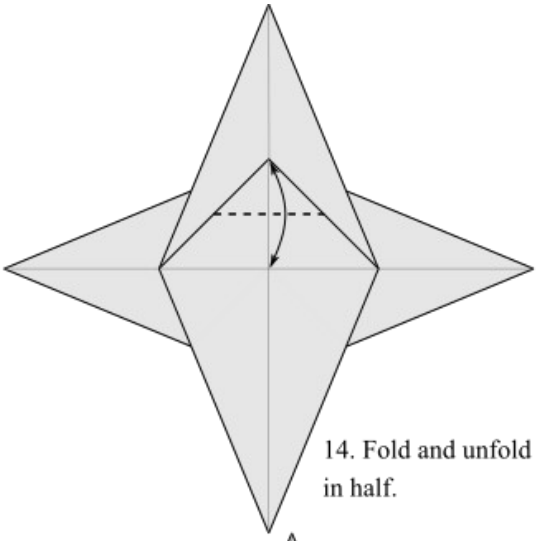
11. Squash fold taking the flap to the right.



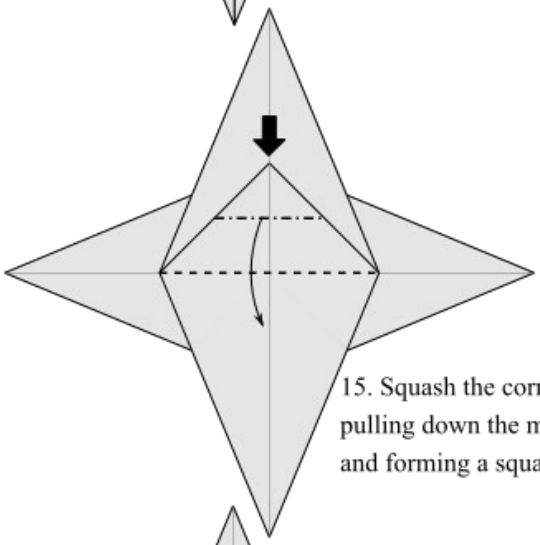
12. Repeat steps 10 and 11 on the left.



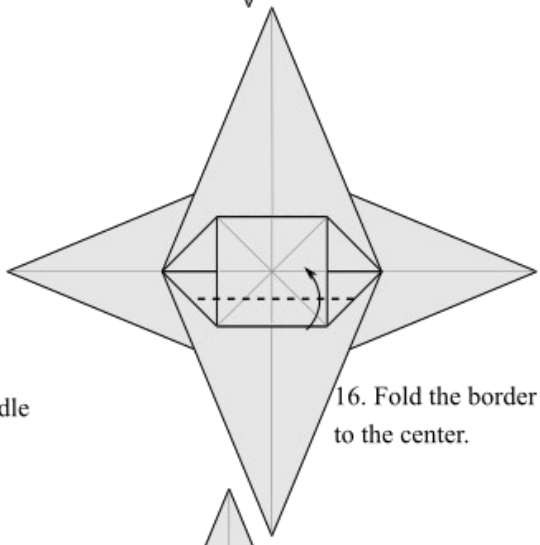
13. Turn around.



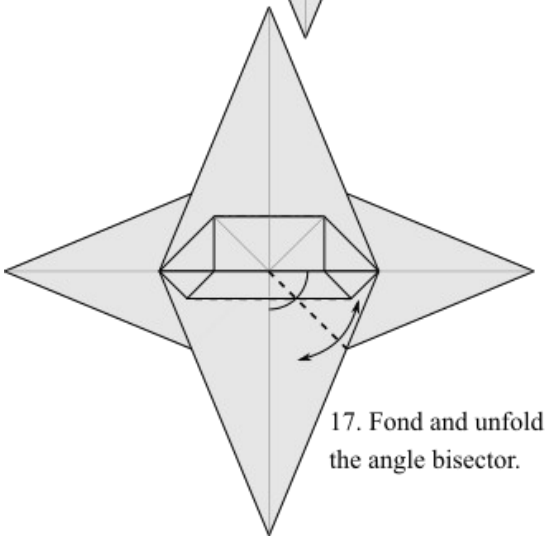
14. Fold and unfold in half.



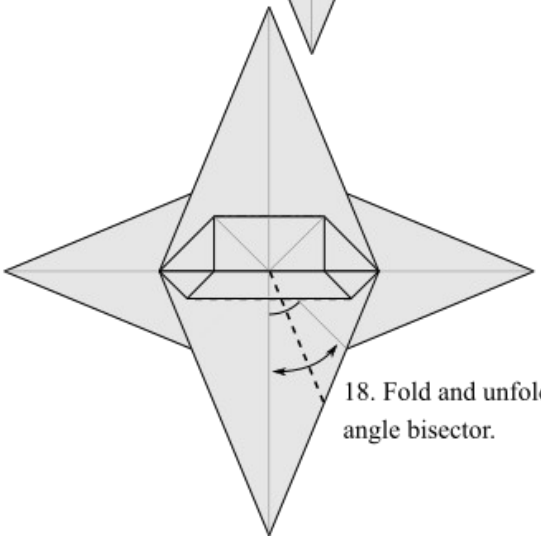
15. Squash the corner pulling down the middle and forming a square.



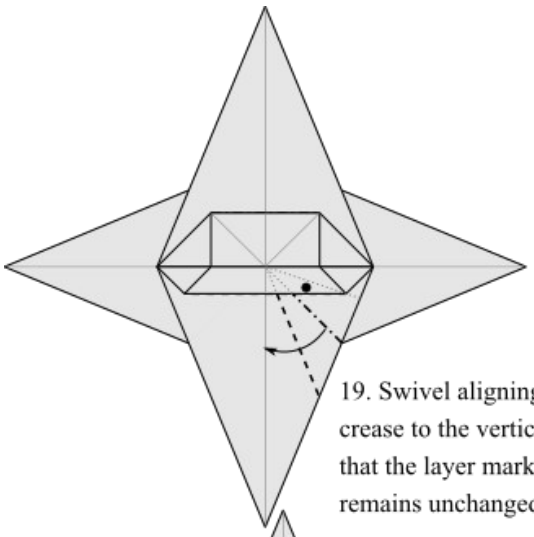
16. Fold the border to the center.



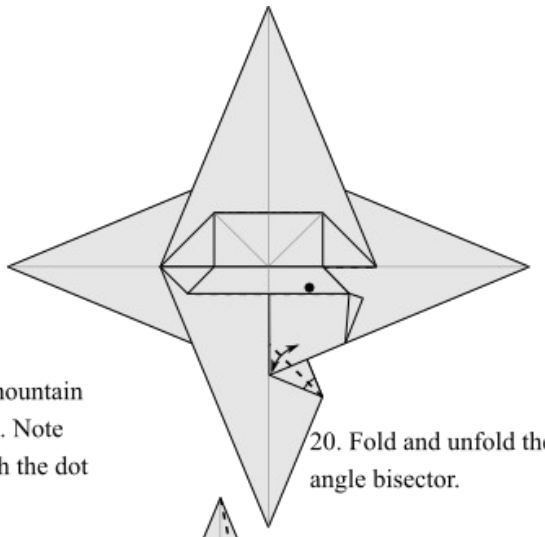
17. Fond and unfold the angle bisector.



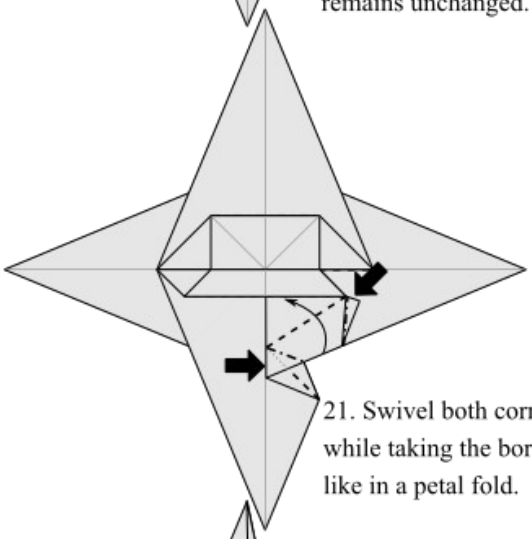
18. Fold and unfold the angle bisector.



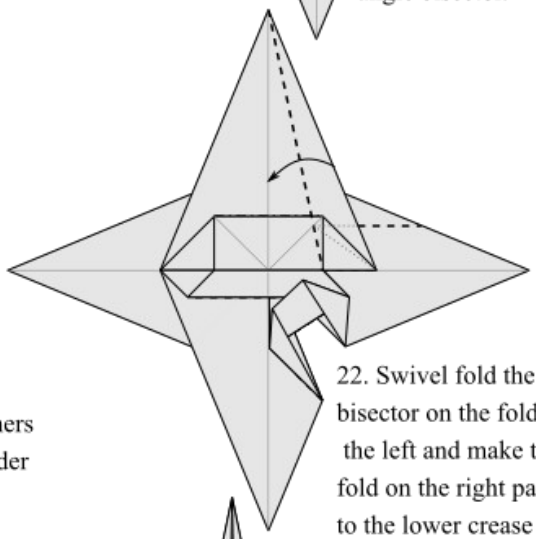
19. Swivel aligning the mountain crease to the vertical axis. Note that the layer marked with the dot remains unchanged.



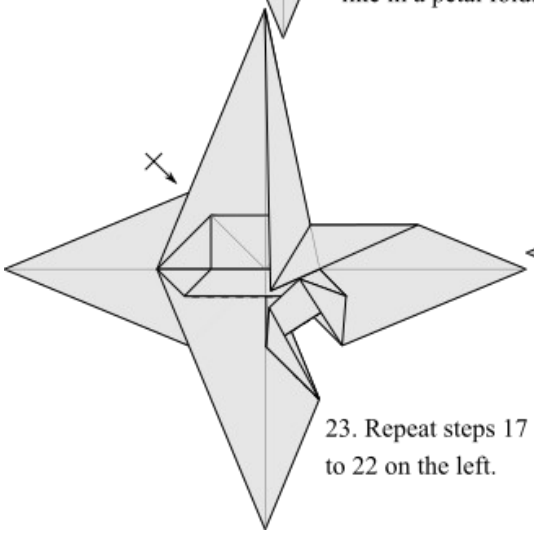
20. Fold and unfold the angle bisector.



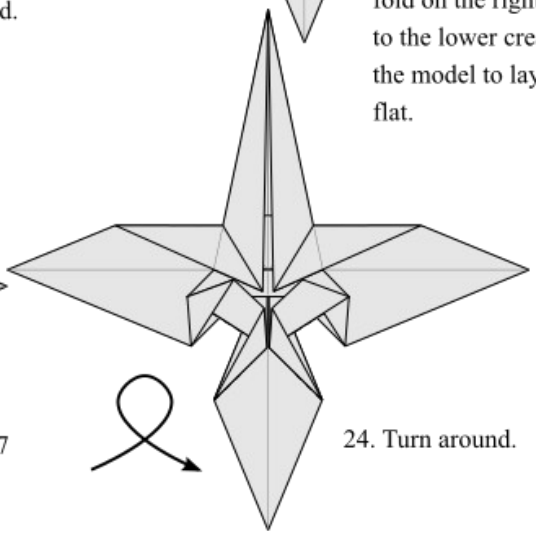
21. Swivel both corners while taking the border like in a petal fold.



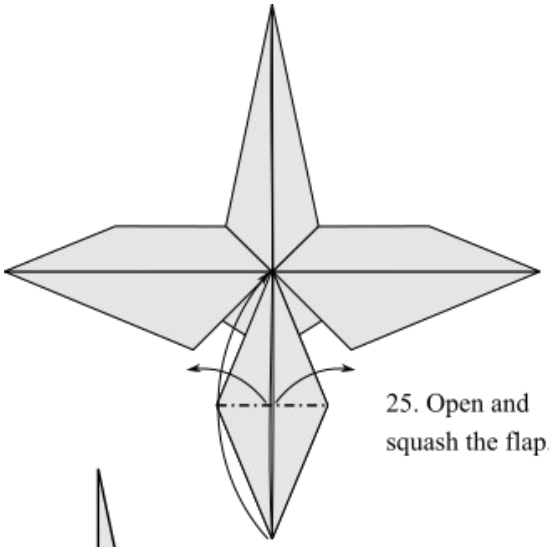
22. Swivel fold the bisector on the fold on the left and make the fold on the right parallel to the lower crease for the model to lay flat.



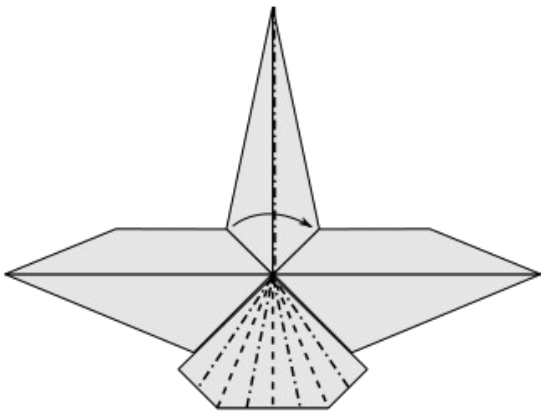
23. Repeat steps 17 to 22 on the left.



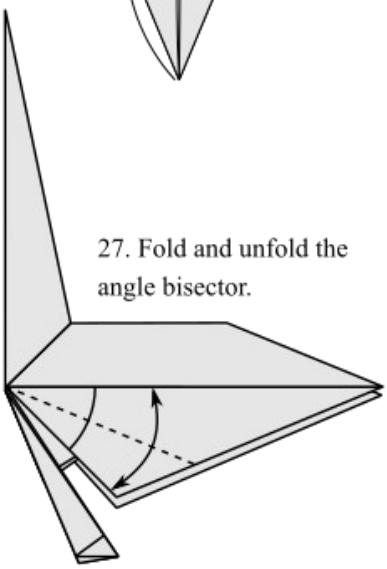
24. Turn around.



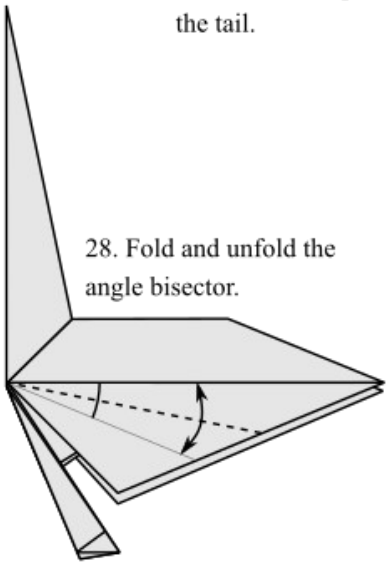
25. Open and squash the flap.



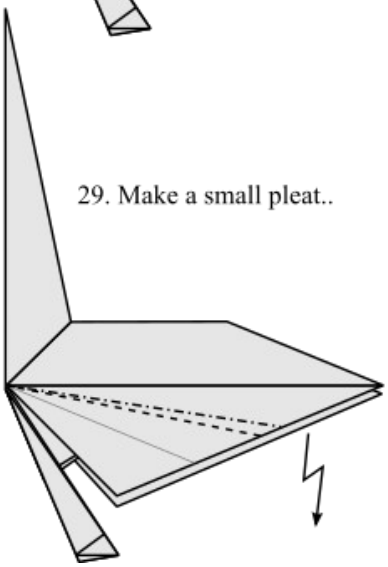
26. Fold the figure in half while collapsing the tail.



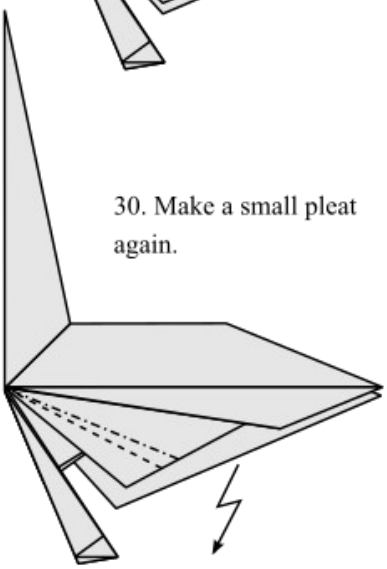
27. Fold and unfold the angle bisector.



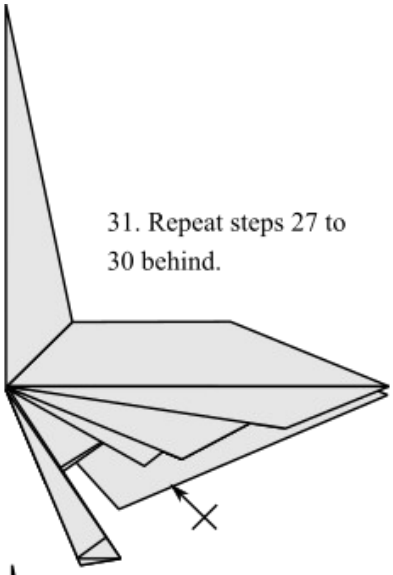
28. Fold and unfold the angle bisector.



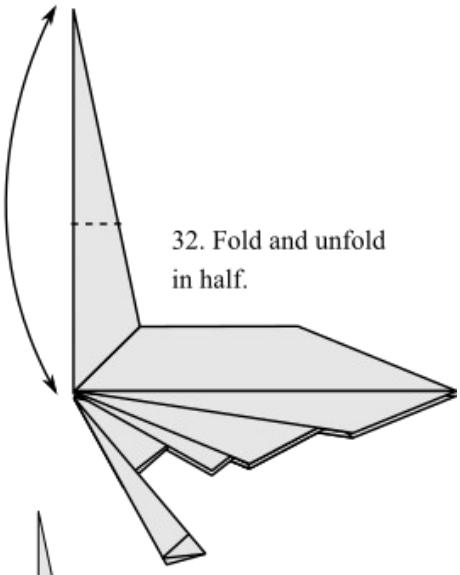
29. Make a small pleat..



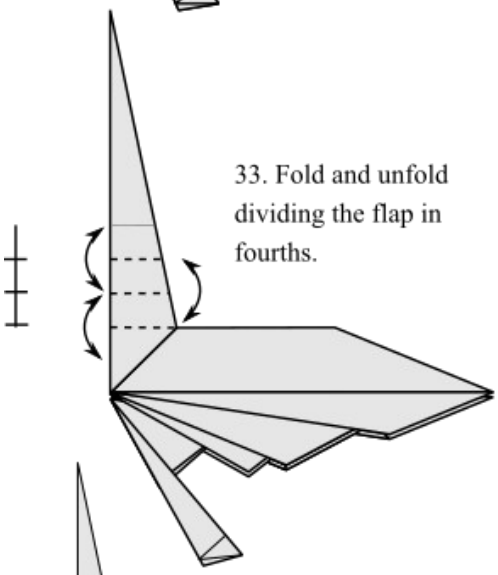
30. Make a small pleat again.



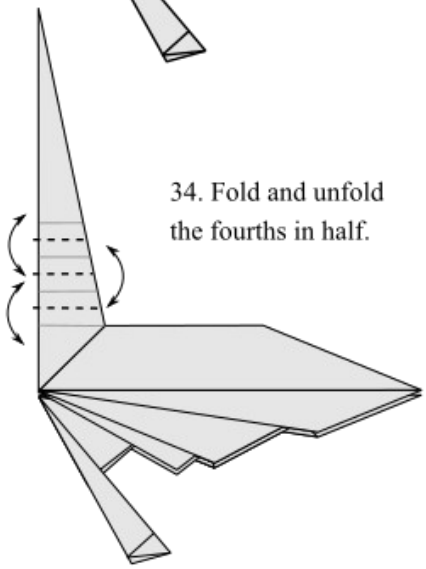
31. Repeat steps 27 to 30 behind.



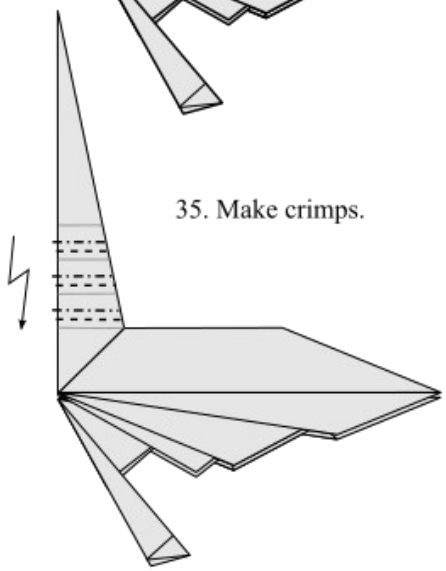
32. Fold and unfold in half.



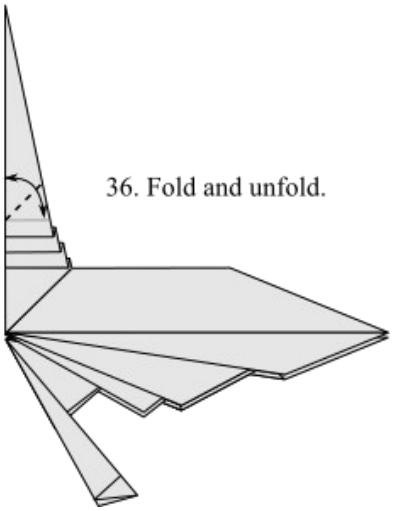
33. Fold and unfold dividing the flap in fourths.



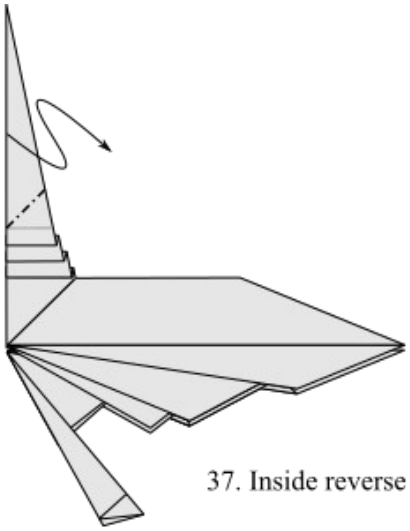
34. Fold and unfold the fourths in half.



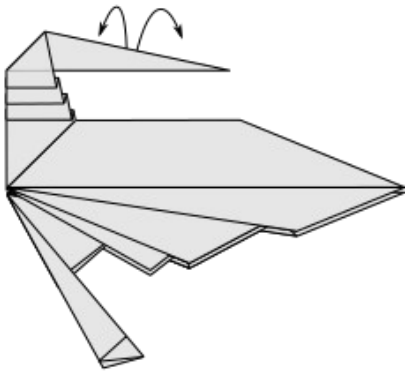
35. Make crimps.



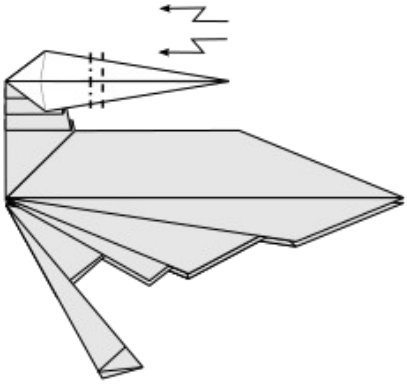
36. Fold and unfold.



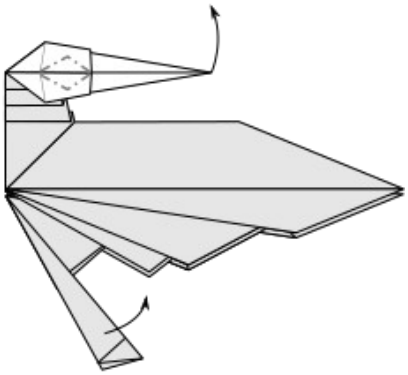
37. Inside reverse fold..



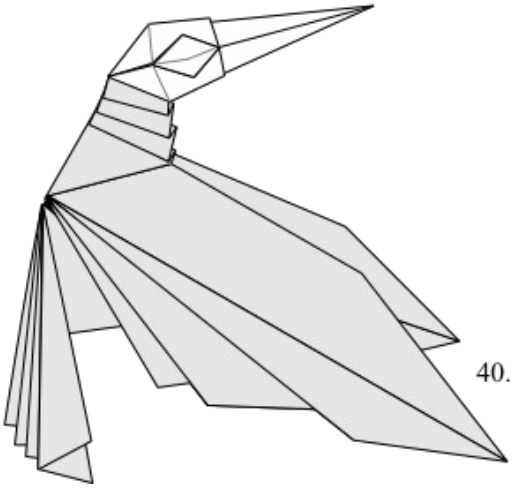
38. Pull a layer of paper out and bring it downwards. The model will not lay flat.



39. Crimp to form the beak.



40. Add details: form the eyes, turn the head up and open the tail.



40. Finished model.