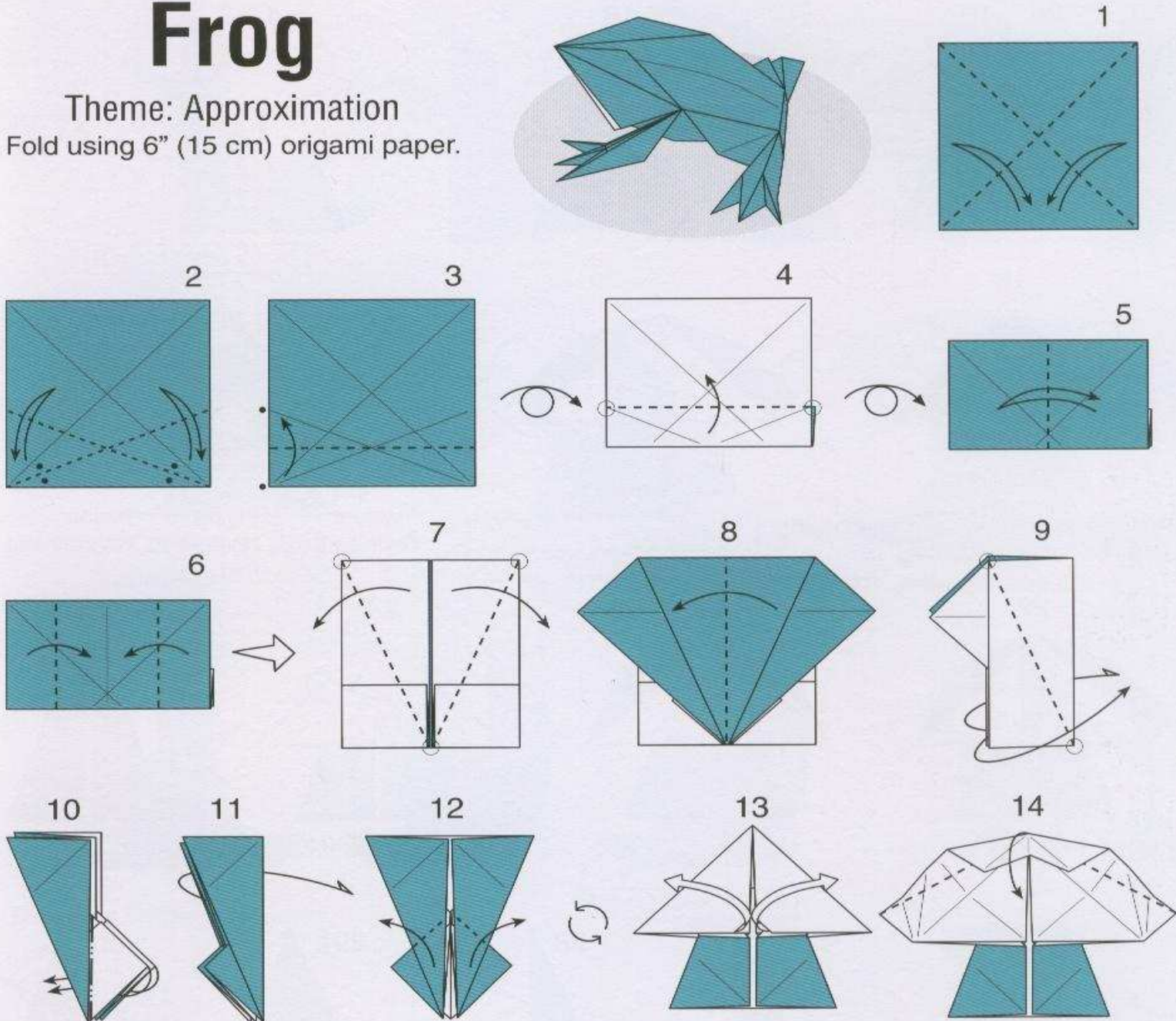
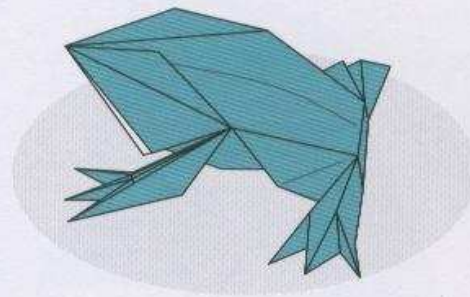


Frog

Theme: Approximation

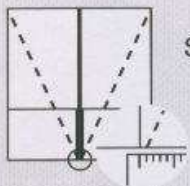
Fold using 6" (15 cm) origami paper.



Inside reverse-fold

Approximation

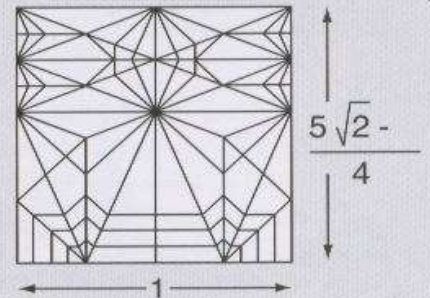
If you calculate assuming that the angles of creases are multiples of 22.5° , then the crease pattern of this *Frog* does not fit in a square, as shown on the right. The ratio of the height to the width is about 1.017...



Step 7

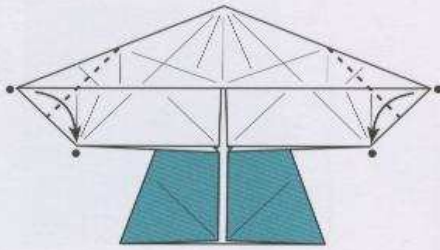
Theoretically, there is a gap of about $1/16''$.

That means, when folded using 6" (15 cm) paper, there is a gap of about $1/16''$ (1 mm) at step 7. But in practice, you do not have to bother about it. For some models, folding precisely is essential because errors will be magnified through the sequence. But for other models like this, errors will be absorbed in paper. That is one of the differences between real-world origami and pure geometry, where lines have no width and surfaces have no thickness.

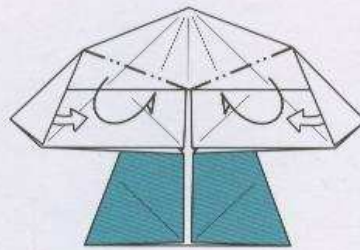


The crease pattern of *Frog* (mountain and valley folds are not shown).

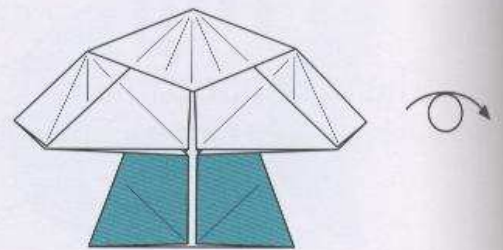
15



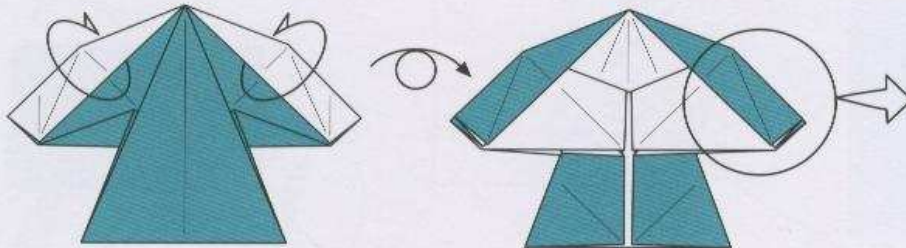
16



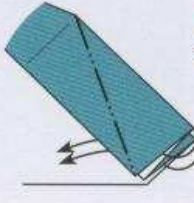
17



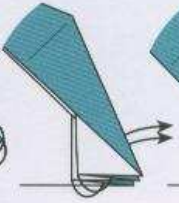
18



19



20



21



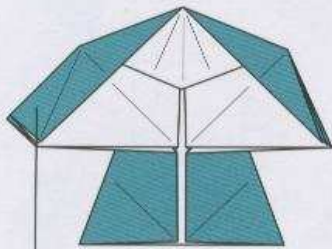
Reverse to color-change while paying attention not to unfold step 15.

Inside reverse-fold

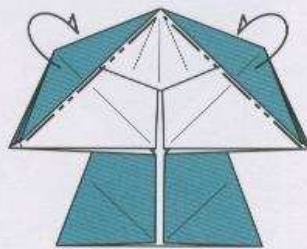
Inside reverse-fold

Inside reverse-fold

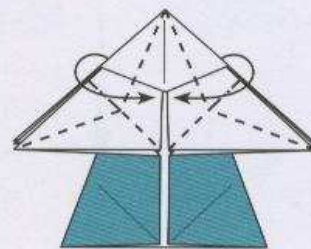
22



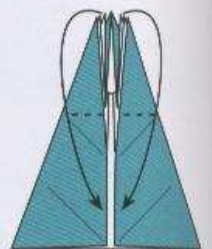
23



24



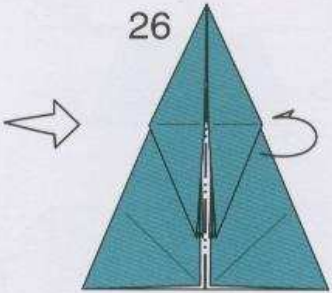
25



Repeat steps 19-21.

Rabbit-ear-fold

26



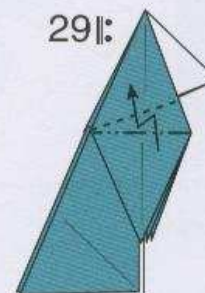
27



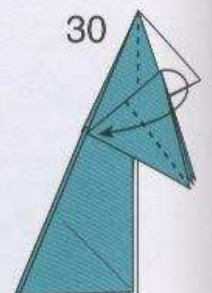
28



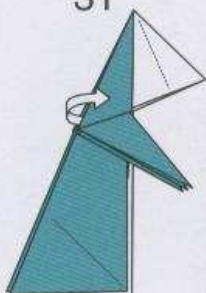
29



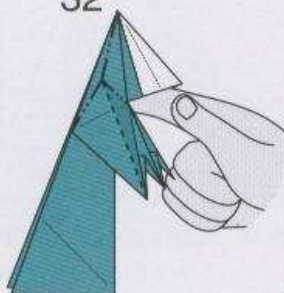
30



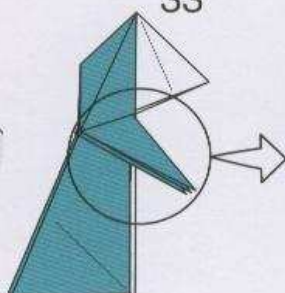
31



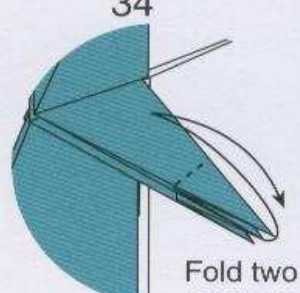
32



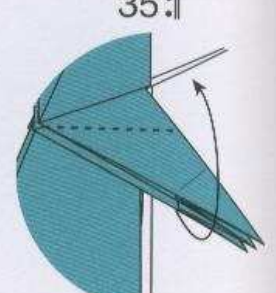
33



34



35

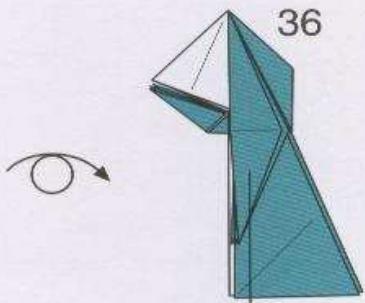


Open slightly.

Pop up from inside.

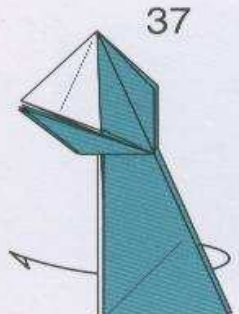
Fold two layers.

36

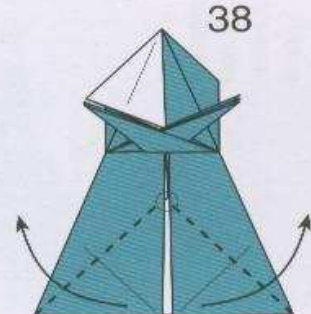


Repeat steps 29-35.

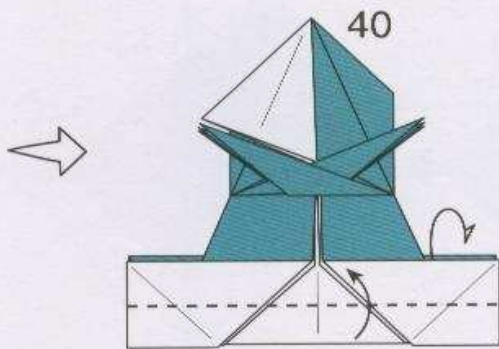
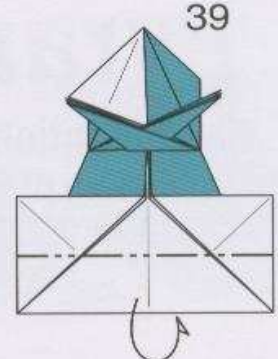
37



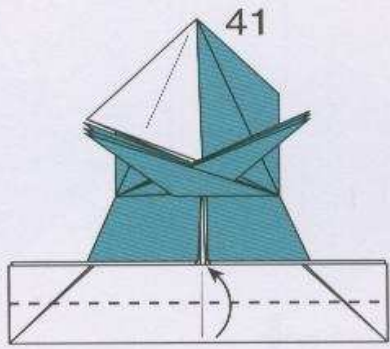
38



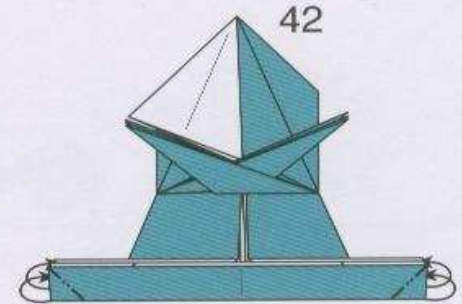
39



40

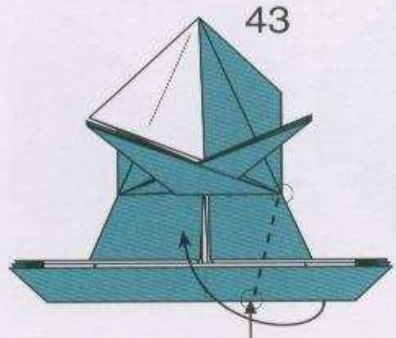


41



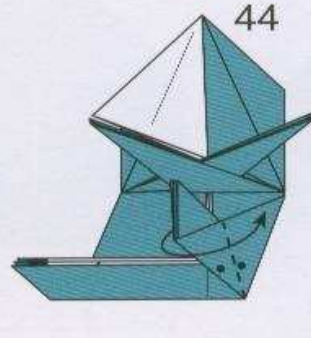
42

Inside reverse-fold



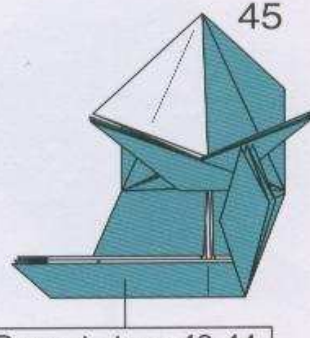
43

There is a hidden edge here.

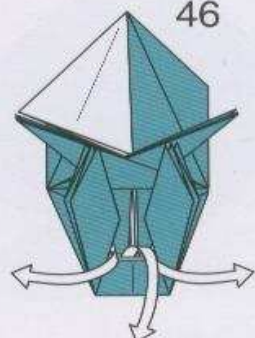


44

Repeat steps 43-44.

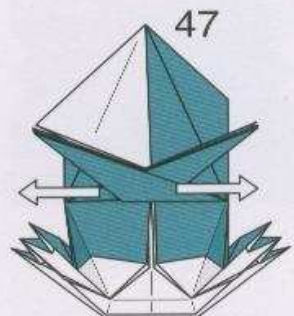


45



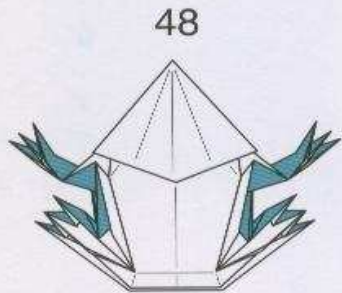
46

Open to make it 3D box-shape.

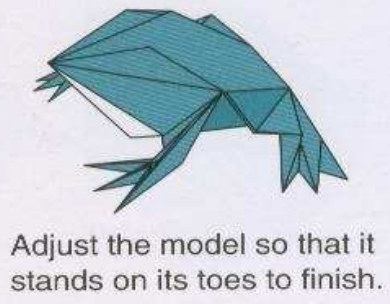


47

Pull apart as far as possible.



48

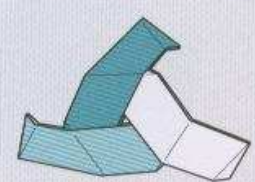


Adjust the model so that it stands on its toes to finish.

Another interesting approximation

$$4 \times \sqrt{3} = 6.928... \approx 7$$

Fold a square in fourths, like an accordion, and fold as shown on the right. You will obtain a modular unit that can be assembled as shown below.



Assembly



30-piece