

Combination Silverhedra 1, 2 and 3

Designed by David Mitchell

Combination silverhedra are modular origami polyhedra whose faces are a combination of silver triangles and other regular polygonal shapes.

These diagrams explain how to make three such polyhedra, in each case by combining 6 modules folded from squares.



Number 1 is a delicate and quite unstable assembly, number 2 is somewhat less delicate and more robust and number 3 is the least delicate and most robust of them all, although correspondingly difficult to assemble. All three will benefit from being folded from quite thick, strong paper.

Combination silverhedra 1 and 2 both have six square faces, eight equilateral faces, which are sunken, and 24 silver triangle faces. Combination silverhedron 3 has eight equilateral faces, of two different sizes, all of which are sunken, and 12 silver triangle faces. All three designs possess the somewhat odd property that they cannot be stood upright on any of their silver triangle faces. They are good examples of original forms created by using modular origami.

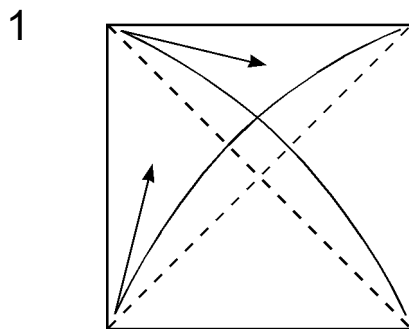
I discovered these designs in 1999, number 1 by serendipity while playing with windmill bases, and numbers 2 and 3 by deduction thereafter.

There are, of course, other combination silverhedra but they are not so easily modelled by modular origami.

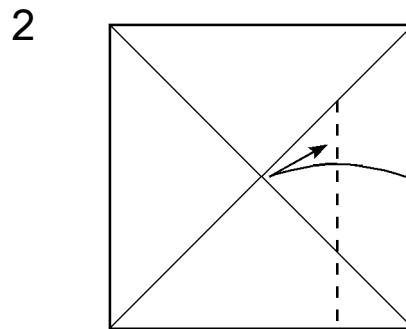
Combination Silverhedron 1

You will need six squares of paper. These diagrams show you how to make combination silverhedron 1 using two squares in each of three contrasting but complementary colours. Combination silverhedron 1 is quite a delicate design and is best made from fairly heavy paper.

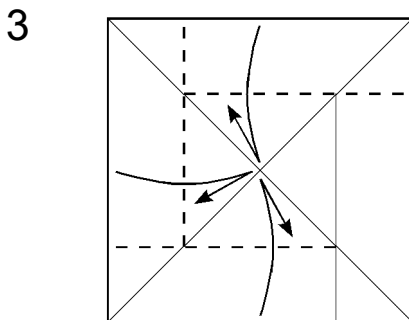
If you are using irogami begin with your paper arranged white side up.



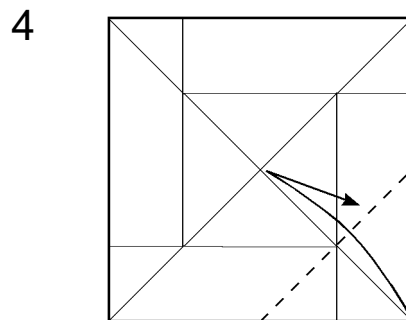
1. Fold in half diagonally, then unfold, in both directions.



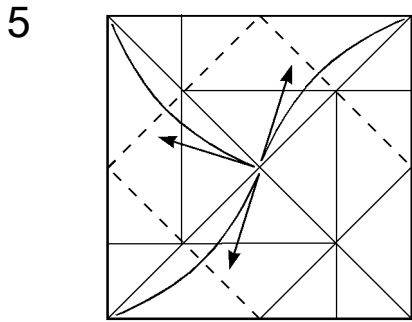
2. Fold the right edge inwards, then unfold, using the point where the two diagonals cross as a location point. The new crease should be parallel to the vertical edges of the paper and should not extend upwards beyond the diagonal crease.



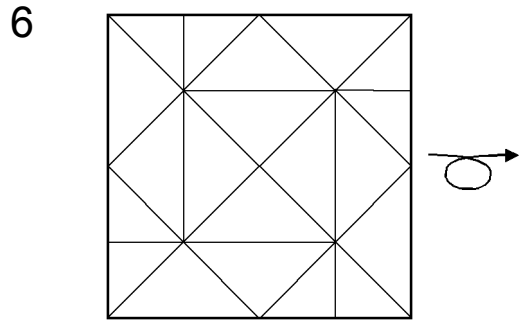
3. Repeat step 2 on the other three edges.



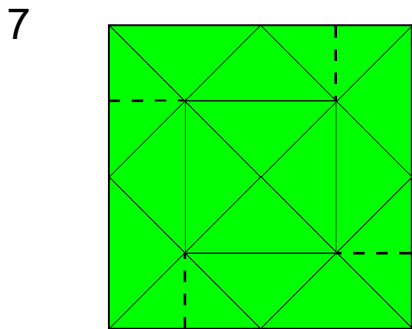
4. Fold the bottom right corner into the centre, then unfold.



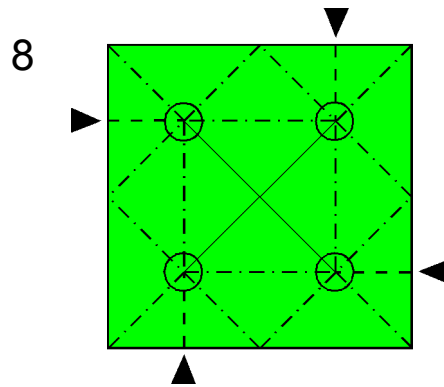
5. Repeat step 4 on the other three corners.



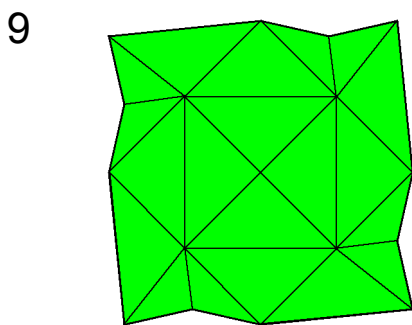
6. The resulting crease pattern should look like this. Turn over sideways.



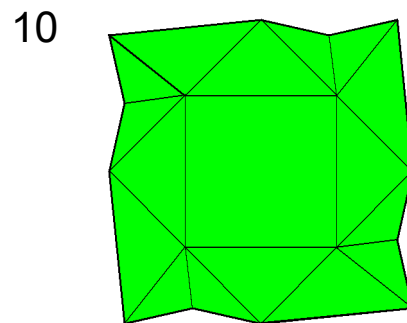
7. Reverse the direction of the four small crease marked with valley fold symbols.



8. Collapse into the shape shown in picture 9.

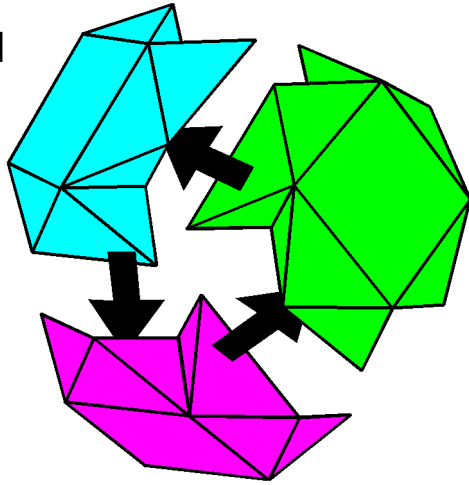


9. Fold all six modules to look like this.



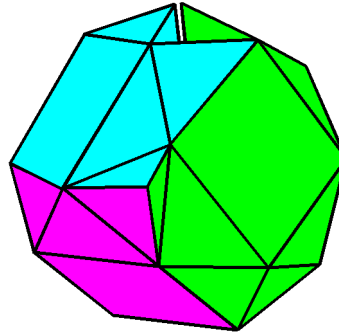
10. The finished design looks better if the central square is free of creases but this is difficult to achieve.

11



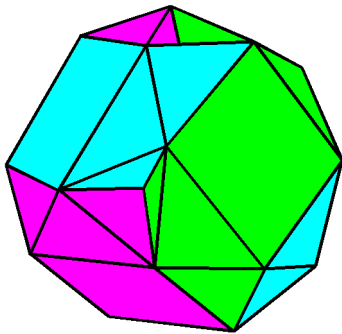
11. Three modules go together like this.

12



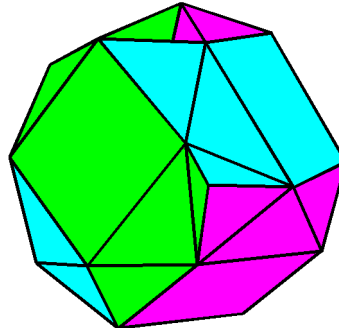
12. The other three modules are added in a similar way. You may find it necessary to temporarily hold the modules together using small sticky strips cut from message notes while you complete the assembly.

13



13. When it is finished combination silverhedron 1 will look like this.

14

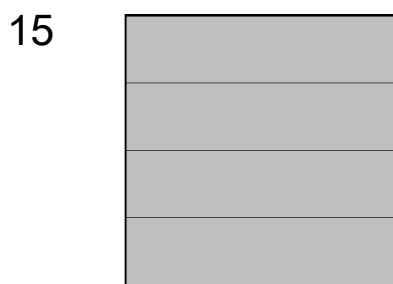


14. You can also make an enantiomeric form.

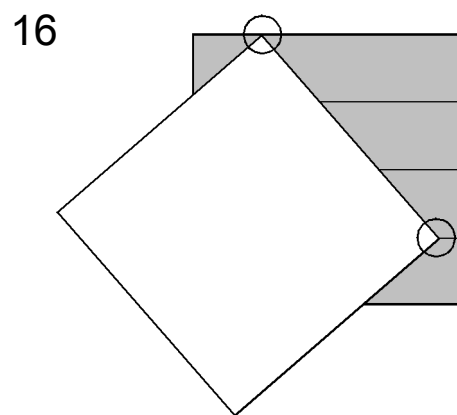
Combination Silverhedron 2

You will need six squares of paper and an extra square of the same size to act as a template. These diagrams show you how to make combination silverhedron 2 using two squares in each of three contrasting but complementary colours. Combination silverhedron 2 is quite a delicate design and is best made from fairly heavy paper.

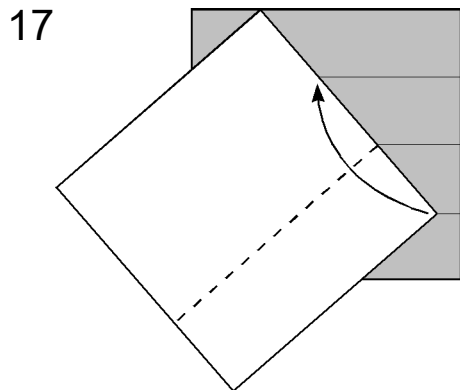
If you are using irogami begin with your paper arranged white side up.



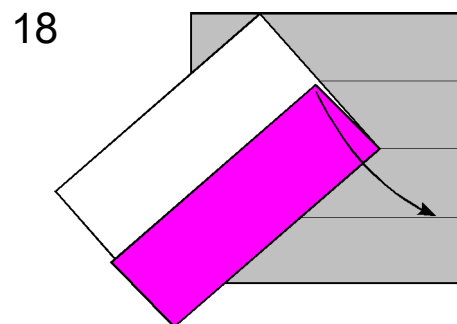
15. Begin with a seventh identically sized square divided into quarters. This is the template.



16. Lay your first square on top of the template like this.

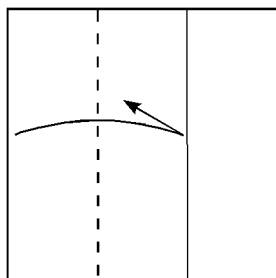


17. Make sure the sheets don't slip out of alignment as you make this fold.



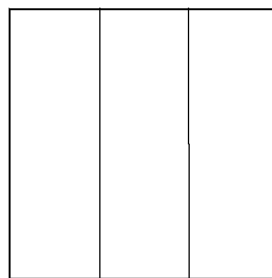
18. Open out the fold made in step 17 and remove from the template.

19



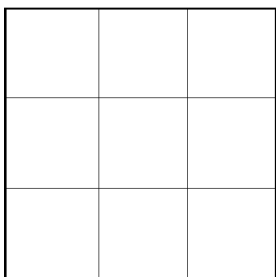
19. Use the crease made in step 17 to locate this fold.

20



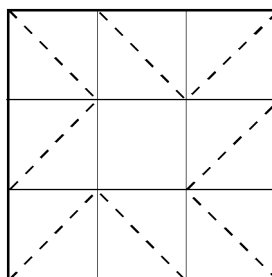
20. Your paper is divided into thirds. Rotate it through ninety degrees and repeat steps 16 through 19.

21



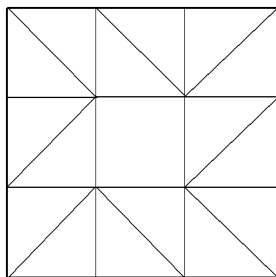
21. This is the result. The paper is now divided into nine smaller squares.

22



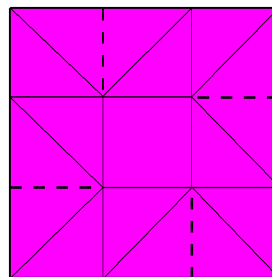
22. Make a diagonal crease across eight of the small squares keeping to the pattern shown.

23



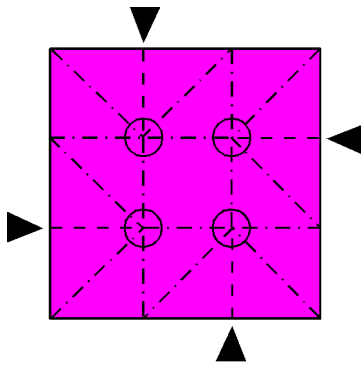
23. Turn over sideways.

24



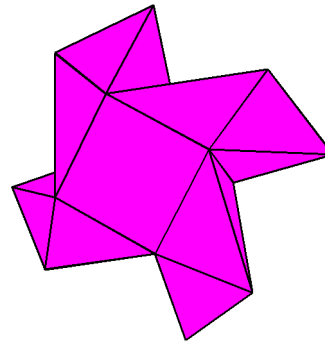
24. Reverse the direction of the four small creases marked with valley fold lines.

25



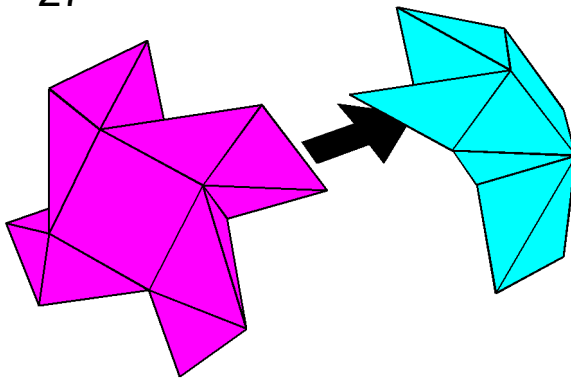
25. Make the module three-dimensional by gently pushing inwards at the points shown. The points marked with circles should become slightly convex as you do this. Make sure you don't reverse the direction of any of the creases as you do this.

26



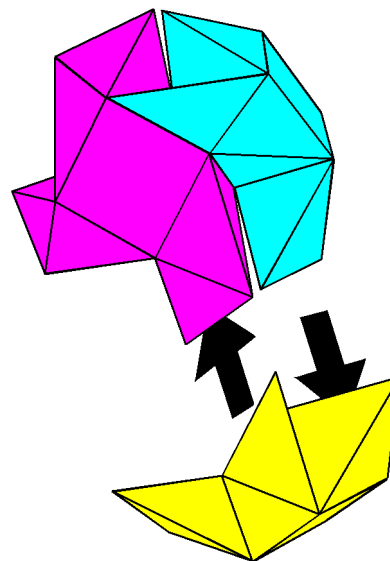
26. Now fold the other five modules in the same way.

27



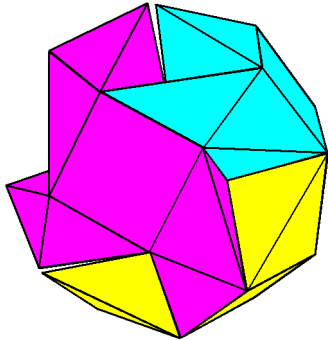
27. Insert the first module into the second like this.

28



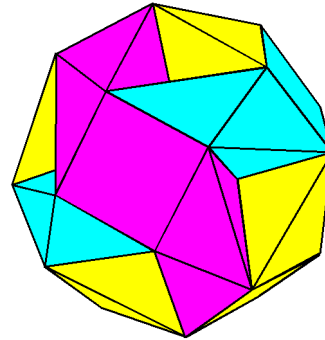
28. Now add the third, making sure the arms of the modules interweave in the way shown.

29



29. Add the remaining modules in a similar way to complete the form.

30



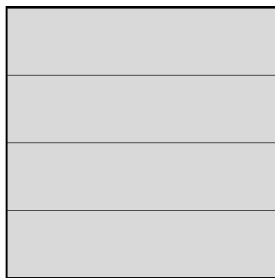
30. Combination Silverhedron 2 is finished. You can also make an enantiomorphic form.

Combination Silverhedron 3

You will need six squares of paper and an extra square of the same size to act as a template. These diagrams show you how to make combination silverhedron 3 using two squares in each of three contrasting but complementary colours. Combination silverhedron 3 is less delicate than the other two designs and can easily be made from light or heavy paper.

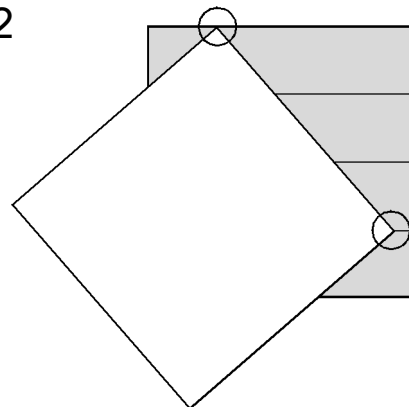
If you are using irogami begin with your paper arranged white side up.

31



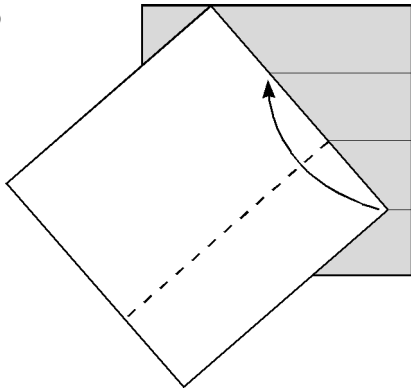
31. Begin with a seventh identically sized square divided into quarters. This is the template.

32



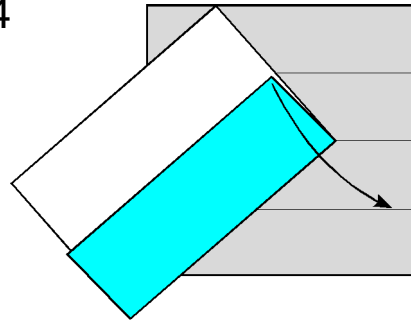
32. Lay your first square on top of the template like this.

33



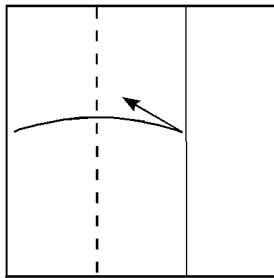
33. Make sure the sheets don't slip out of alignment as you make this fold.

34



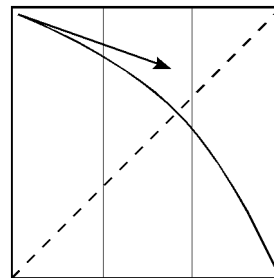
34. Open out the fold made in step 33 and remove from the template.

35



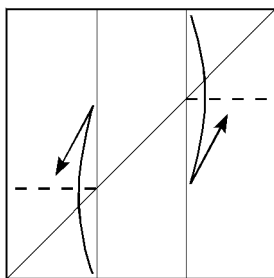
35. Fold the left edge onto the vertical crease, then unfold.

36



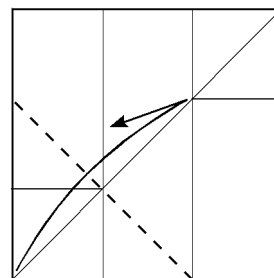
36. Fold in half diagonally as shown, then unfold.

37



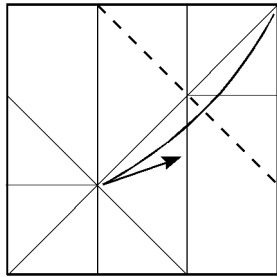
37. Make these two extra creases between the vertical creases and the upright edges using the points where the diagonal and the vertical creases intersect as location points.

38



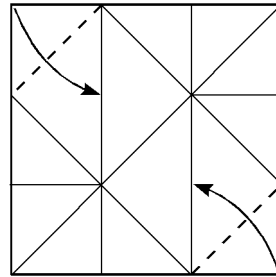
38. Fold the bottom left corner inwards as shown, then unfold.

39



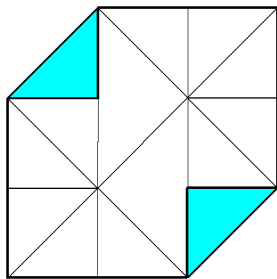
39. Repeat fold 39 on the top right corner.

40



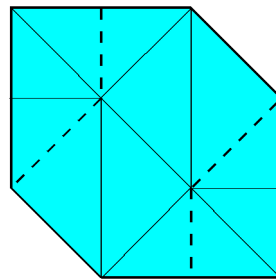
40. Fold the top left and bottom right corners inwards as shown.

41



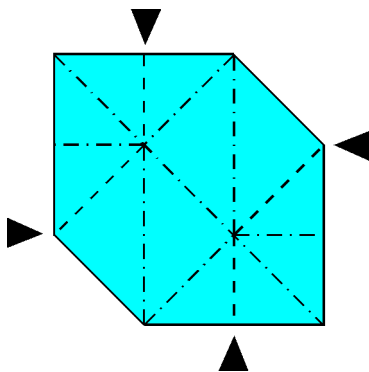
42. Turn over sideways.

42



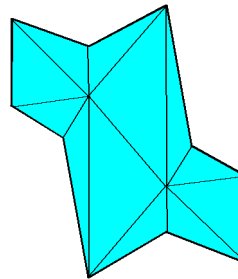
43. Reverse the direction of the four creases marked with valley fold lines.

43

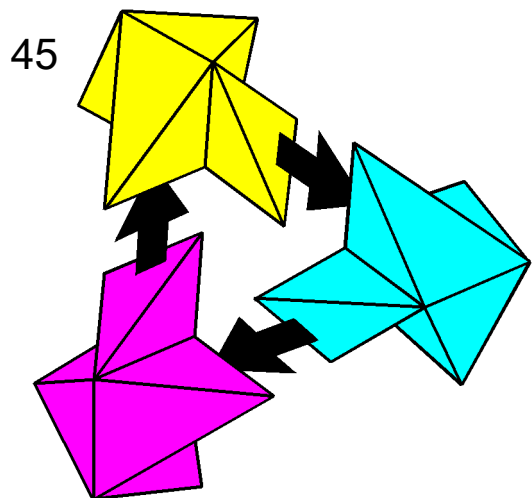


43. Collapse into the shape shown in picture 44.

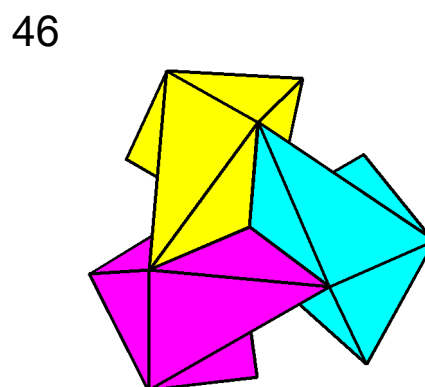
44



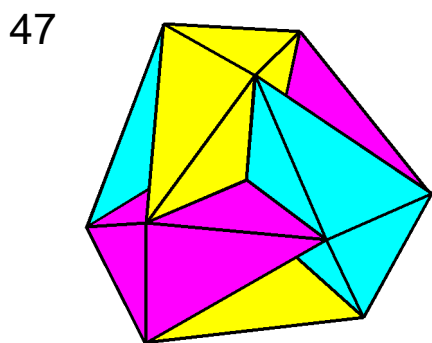
44. This is the finished module. Make 6.



45. Three modules go together like this.



46. Add the three remaining modules in a similar way.



47. Combination silverhedron 3 is finished. You can also make an enantiomorphic form.

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