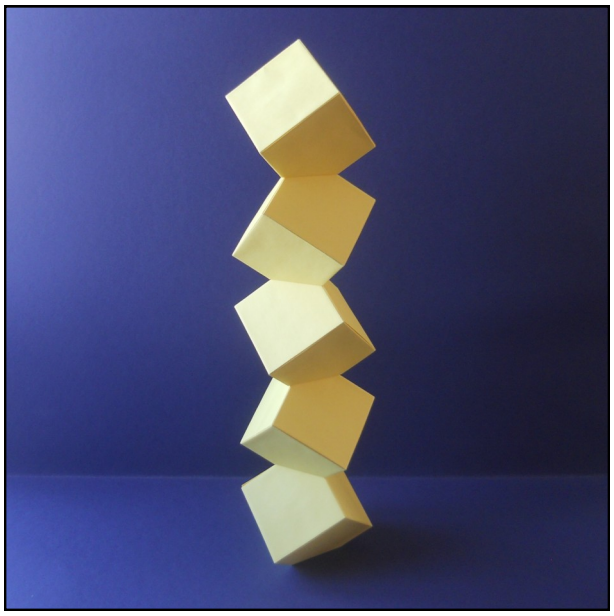
Columbus Cubes

Designed by David Mitchell

The Columbus Cube is a variation of the Paul Jackson Cube in which one corner is turned inside out to the mid-point of three adjacent edges.

This simple change means that Columbus Cubes can be stacked to form a tower. Several towers can in turn be combined, with the help of joining pieces, to form walls and forests.



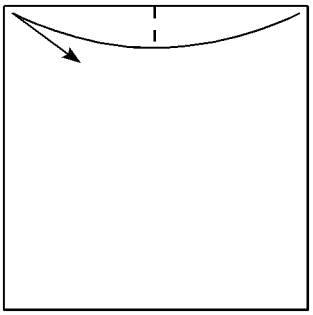
In the early 1970's, probably in 1973, soon after he first discovered his eponymous cube, Paul Jackson realised that individual corners could be turned inside out and used this principle to create the Paul Jackson Cuboctahedron, in which all eight corners are inverted. In 1987 I independently rediscovered the Paul Jackson Cube for myself and similarly realised that corners could be turned inside out. Then, in 1989, I realised that inverting just one corner made it possible to use the resulting form, which I christened the Columbus Cube, as a macromodule to create stacks and other interesting sculptural forms.

The name Columbus Cube is a reference to the famous story of the Egg of Columbus (see Wikipedia page of this title) which I remember hearing at primary school. A similar story is told about Filippo Brunelleschi, but, to my ears at least, the name the Brunelleschi Cube does not have quite the same ring to it.

You will need six squares of paper for each Columbus Cube. Any kind of paper can be used. First fold the six basic modules then modify three of them to invert one corner.

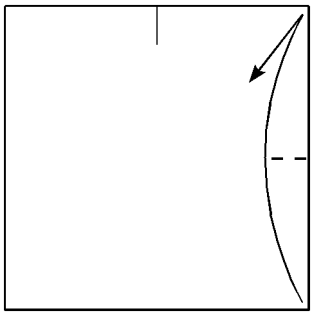
Folding the basic modules

1



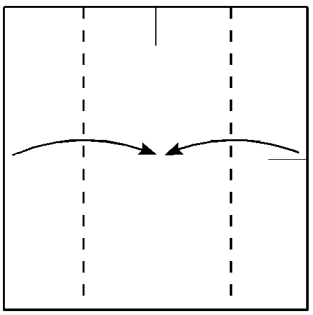
1. Make a tiny crease to mark the middle of the top edge.

2



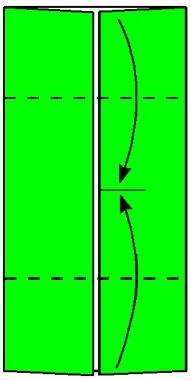
2. Mark the middle of the right hand edge in a similar way.

3



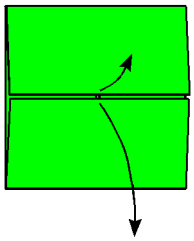
3. Fold both outside edges to the centre using the crease you made in step 1 as a guide.

4



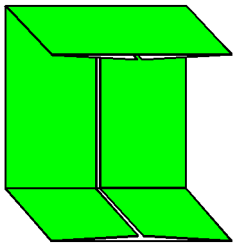
4. Fold the top and bottom edges to the centre using the crease you made in step 2 as a guide.

5



5. Open up both tabs at right angles.

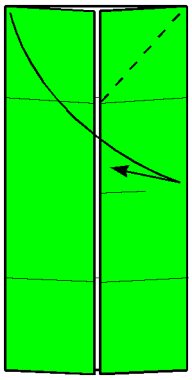
6



6. The module is finished. Make all six. Three modules are used in this form, the other three must be modified to turn one corner inside out.

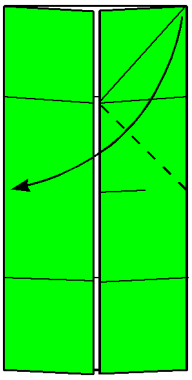
Modifying three of the basic modules

7



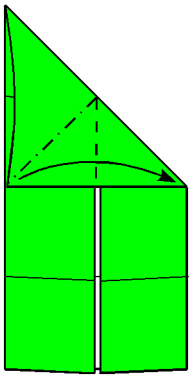
7. Open out the folds made in steps 4 and 5. Fold the right hand edge onto the bottom edge, crease half way across the diagonal, then unfold.

8



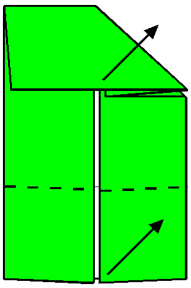
8. Fold the right hand edge onto the top edge but only crease half way across the diagonal.

9



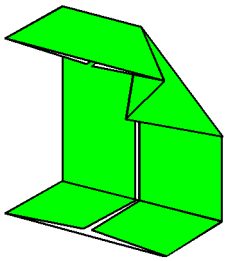
9. Fold the left hand edge of the front layer in half downwards and flatten the layers into the position shown in picture 9.

10



10. Open both flaps up at right angles and stand upright on the flat end.

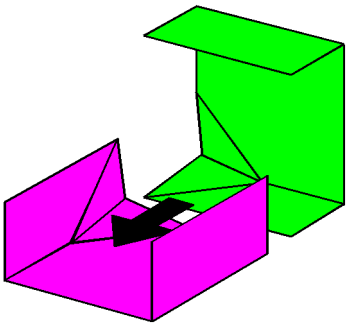
11



11. This is the result. Modify three basic modules to look like this.

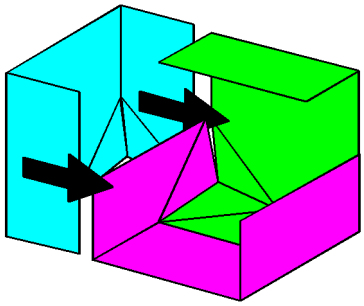
Putting the modules together

12



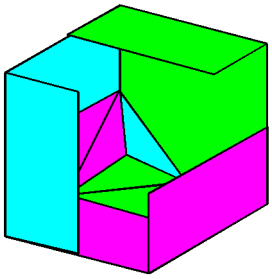
12. Slide two modified modules together like this

13



13. Add a third to complete the inverted corner.

14



14. At this stage the modules should already hold together quite firmly.

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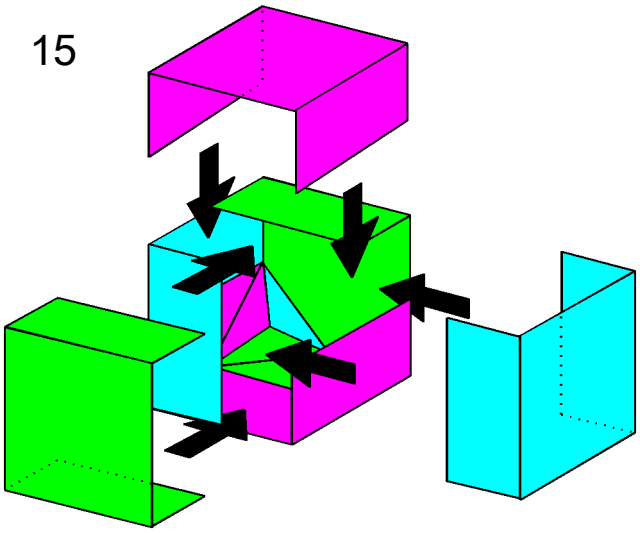
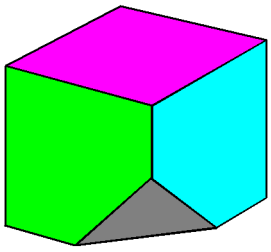


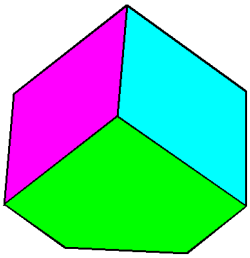
15. Add the three unmodified modules like this.

16



16. The Columbus Cube is finished.

17

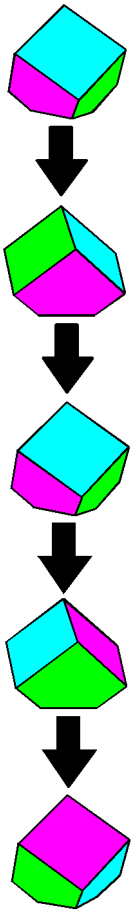


17. The Columbus Cube can be stood, point upwards, on the inverted corner.

Stacking the macromodules

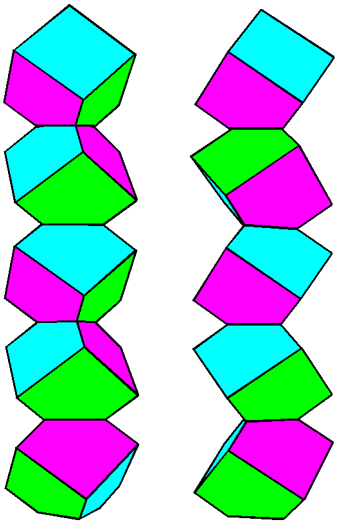
The Columbus Tower is built by the simple expedient of stacking several Columbus Cubes on top of each other like this.

18



18. Five cubes is probably the optimum size of the stack.

19

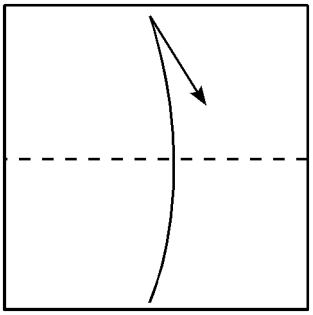


19. The resulting Columbus Tower is a strangely beautiful sculpture.

Several Columbus Cubes can be linked together with joining pieces to form rows or layers that can then be stacked with other such rows or layers to form walls and forests.

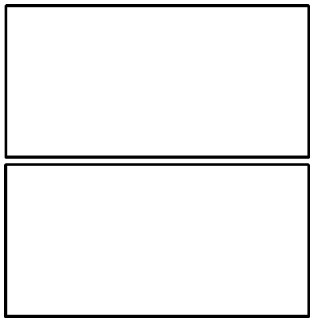
Making the joining pieces

20



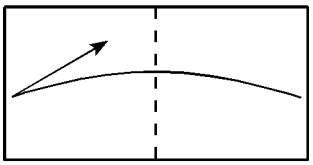
20. Begin with a square of paper the same size as the squares you are folding the Columbus Cubes from. Fold in half upwards, then unfold.

21



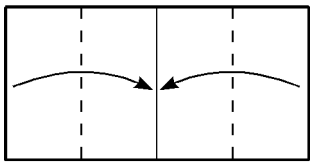
21. Cut along the horizontal crease.

22



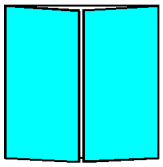
22. Fold in half sideways, then unfold.

23



23. Fold both outside edges to the centre.

24



24. The joining piece is finished.

Linking Columbus Cubes into rows and walls

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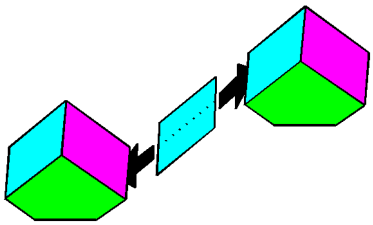
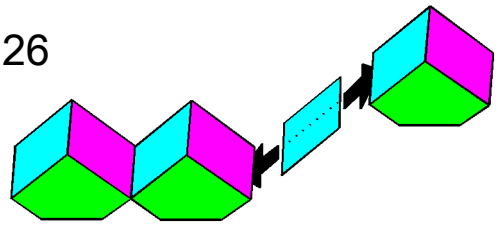


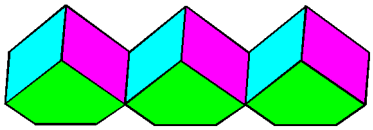
25. Columbus Cubes can be linked into rows like this. The dotted line shows the position of the unfolded edges. Always use the joining pieces in this orientation.

26



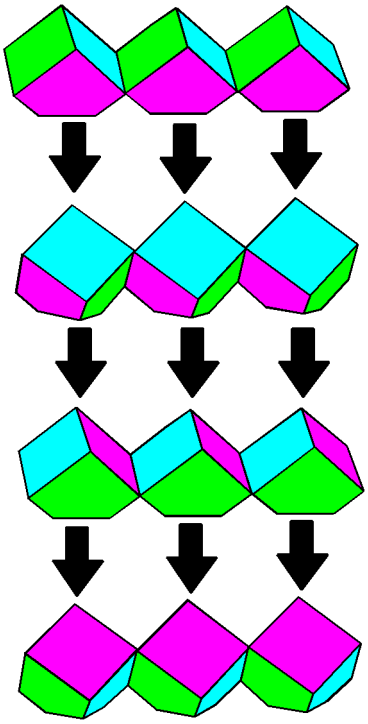
26. Add a second joining piece like this. Make sure you only slide joining pieces half way into the pockets.

27

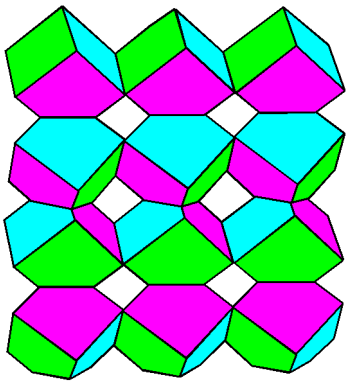


27. The third joining piece slides in like this.

28



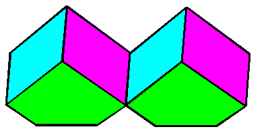
29



28/29. Rows of Columbus Cubes can be stacked on top of each other like this to create walls.

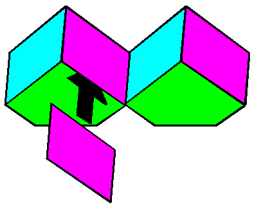
Linking Columbus Cubes into layers and forests

30



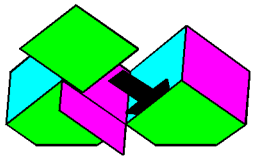
30. Begin by linking two Columbus Cubes together to form a row.

31



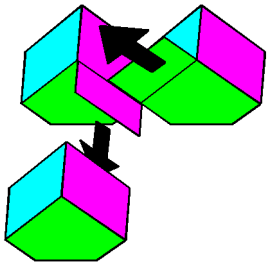
31. Add a second joining piece like this. Make sure you only slide joining pieces half way into their pockets.

32



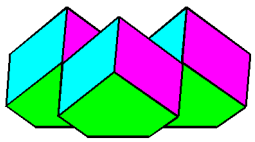
32. The third joining piece slides in like this.

33



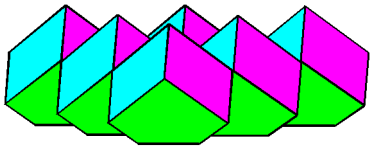
33. Add another cube to the front of the assembly. You may need to temporarily loosen the modules of this cube to achieve this.

34



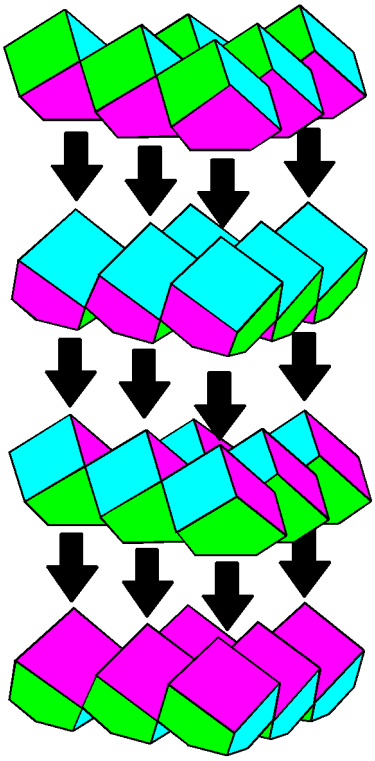
34. This is the result. Push all the modules back into place. The three cubes should hold together firmly once you have done this.

35



35. You can add further rows of Columbus Cubes to the layer assembly as required.

36



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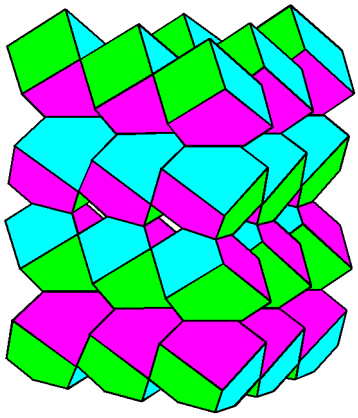

36/37. Layers of Columbus Cubes can be stacked on top of each other like this to create forests.