Puzzle

Imaginary Cube

- Hexagonal Bipyramid -

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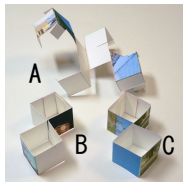
http://www.i.h.kyoto-u.ac.jp/~tsuiki/index-e.html

Red :Cut lines.
Green:Mountain crease at 90 degrees.
Gray :Valley crease at 90 degrees.

1. Fold the nine components.

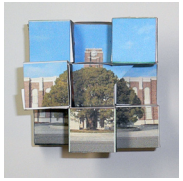


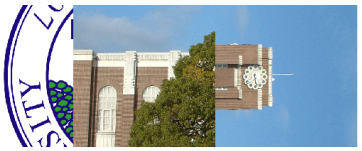
2. Connect three A.

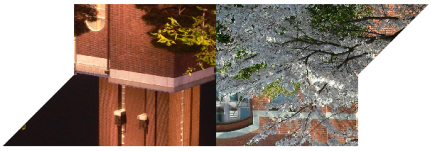
3. Add three B.

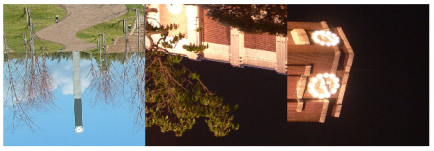
4. Add three C.

5. Complete!



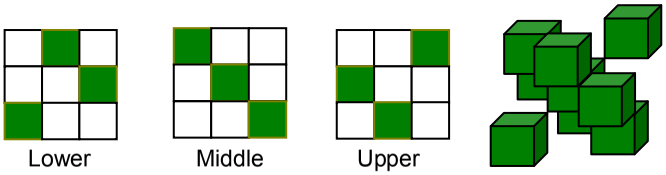




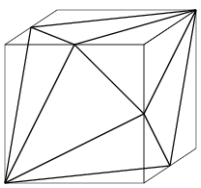


This shape is one of the two ways of cutting a cube into 3□3□3 small cubes and selecting 9 of them so that no overlapping occurs from all the three surface directions.

One can apply this procedure to the 9 cubes to obtain 81 cubes, and repeat it infinitely to obtain the hexagonal bipyramid fractal, which has six (not three!) square projections. Its convex hull is a hexagonal bipyramid, which also has six square projections.



Reference: Hideki Tsuiki, Does it look square? Hexagonal Bipyramids, Triangular Antiprismoids, and their Fractals, in Proc. of Bridges Donostia, Tarquin publications,pp277-186,2007.



Hexagonal bipyramid and the 2nd level approximation of the hexagonal bipyramid fractal.