

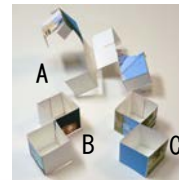
Puzzle
Imaginary Cube
 - Hexagonal Bipyrmaid -

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

1. Fold the nine components.



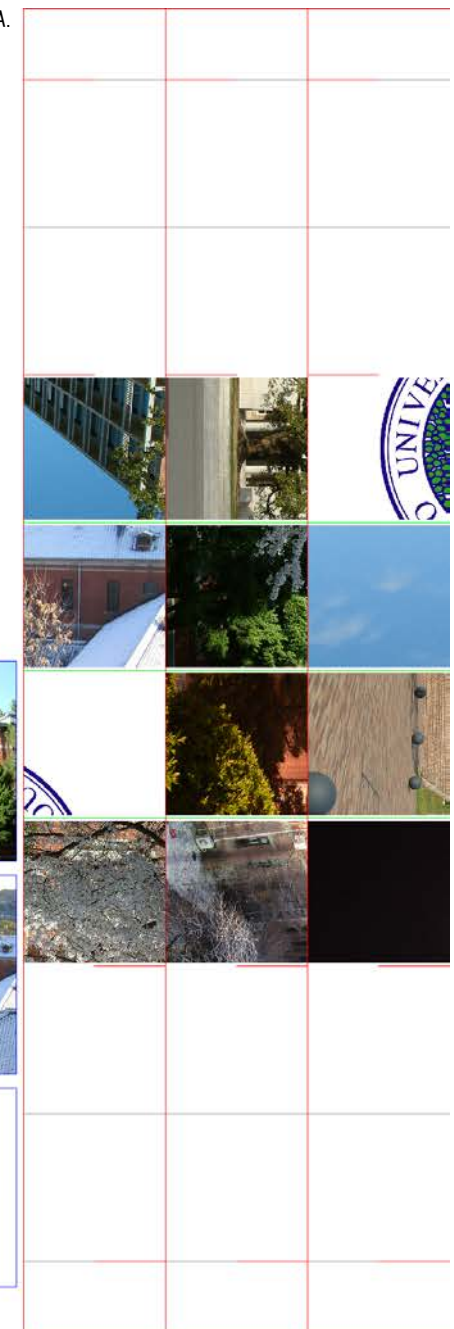
2. Connect three A.



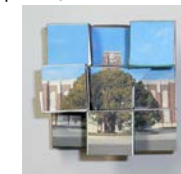
3. Add three B.



4. Add three C.



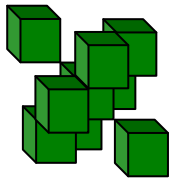
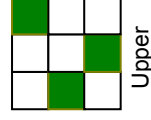
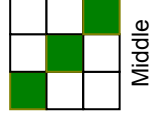
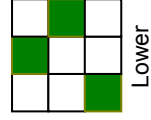
5. Complete!



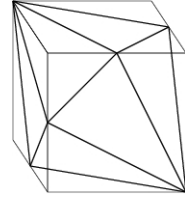


This shape is one of the two ways of cutting a cube into $3 \times 3 \times 3$ small cubes and selecting 9 of them so that no overlapping occurs from all the three surface directions.

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.



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



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