Zero Waste Nearodesic Domes
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http://www.mathematicians.org.uk/eoh
http://maxwelldemon.com

Buckminster Fuller was an architect with a sense of mathematics. He recognised that simple forms would often have the strength and other properties required. As a result he promoted many structures from mathematics that have been found to be excellent for construction. Most notably he promoted the Oct-Tet truss and the geodesic dome. The geodesic dome in particular was taken up by the environmental movement for simple housing. The problem is it requires a fair amount of skill to build and if the faces are made with sheet material, takes quite a bit of waste.

The first to address this directly was Vinay Gupta, creator of the **Hexayurt**. His starting point was the 8'x4' rectangle. A standard size for building materials, for example plywood. In particular he introduced the triangle made from a 2x1 rectangle cut along the diagonal:
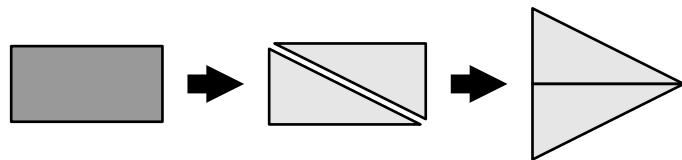

Six of these triangles come together to form a pyramid. The pyramid of six triangles is placed on top of a hexagon of 2x1 rectangles to form the hexayurt (for more details see www.hexayurt.com):


6' wildman
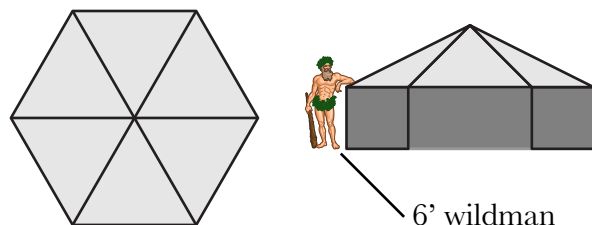
This triangle and rectangle combination can be used to make larger buildings. Here are two:

For the first (the **Tri-dome**) the standard roof (six triangles put together) is lifted higher with squares (2 rectangles together) on 3 of the sides joined by half-roofs:
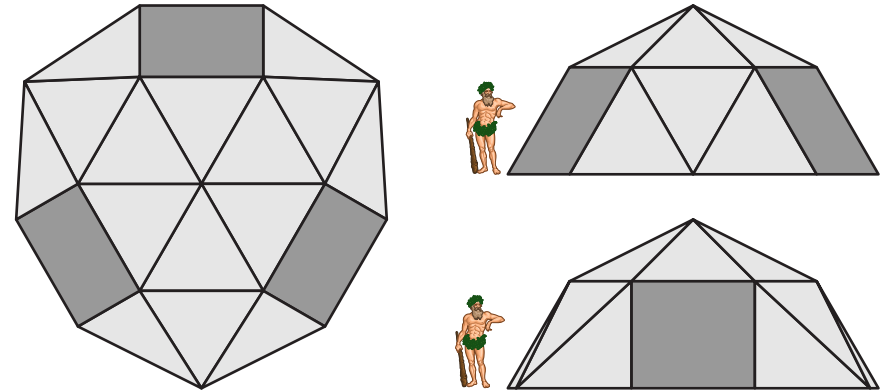
For the second (the **Quad-dome**) four standard roofs are made and leant together around a square. The remaining holes are filled, with a square on top and four squares cut accross the middle round the side. The diagonally cut squares are vertical:
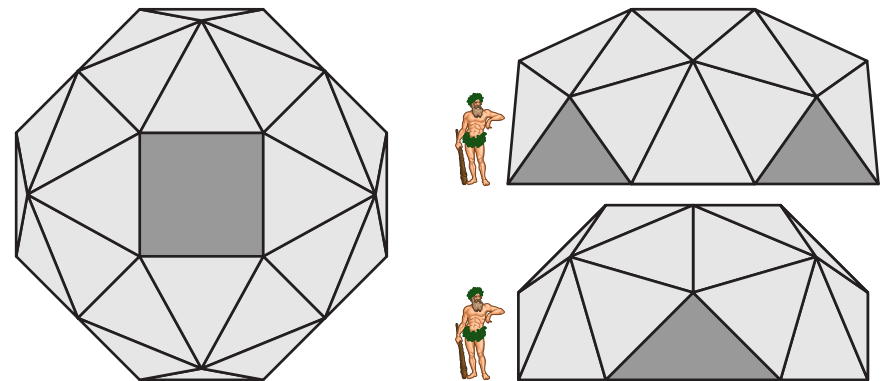
	Height	Floor area	Angles of walls
Hexayurt	8'	111 sq.ft.	90
Tri-dome	10'11"	429 sq.ft.	60, 63.46
Quad-dome	11' 4"	448 sq.ft.	84.7, 90

The Hexayurt
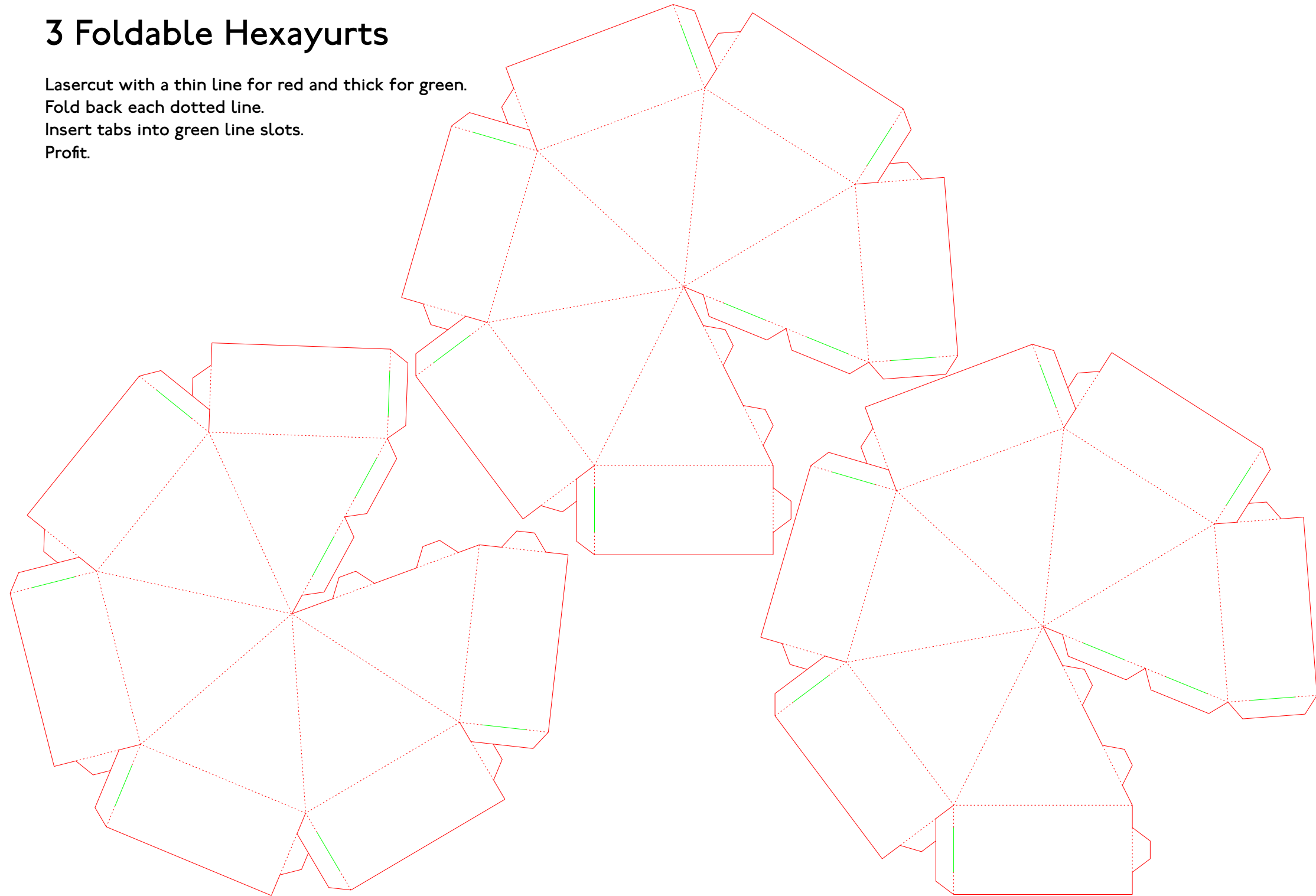

The Hexayurt Family

3 Foldable Hexayurts

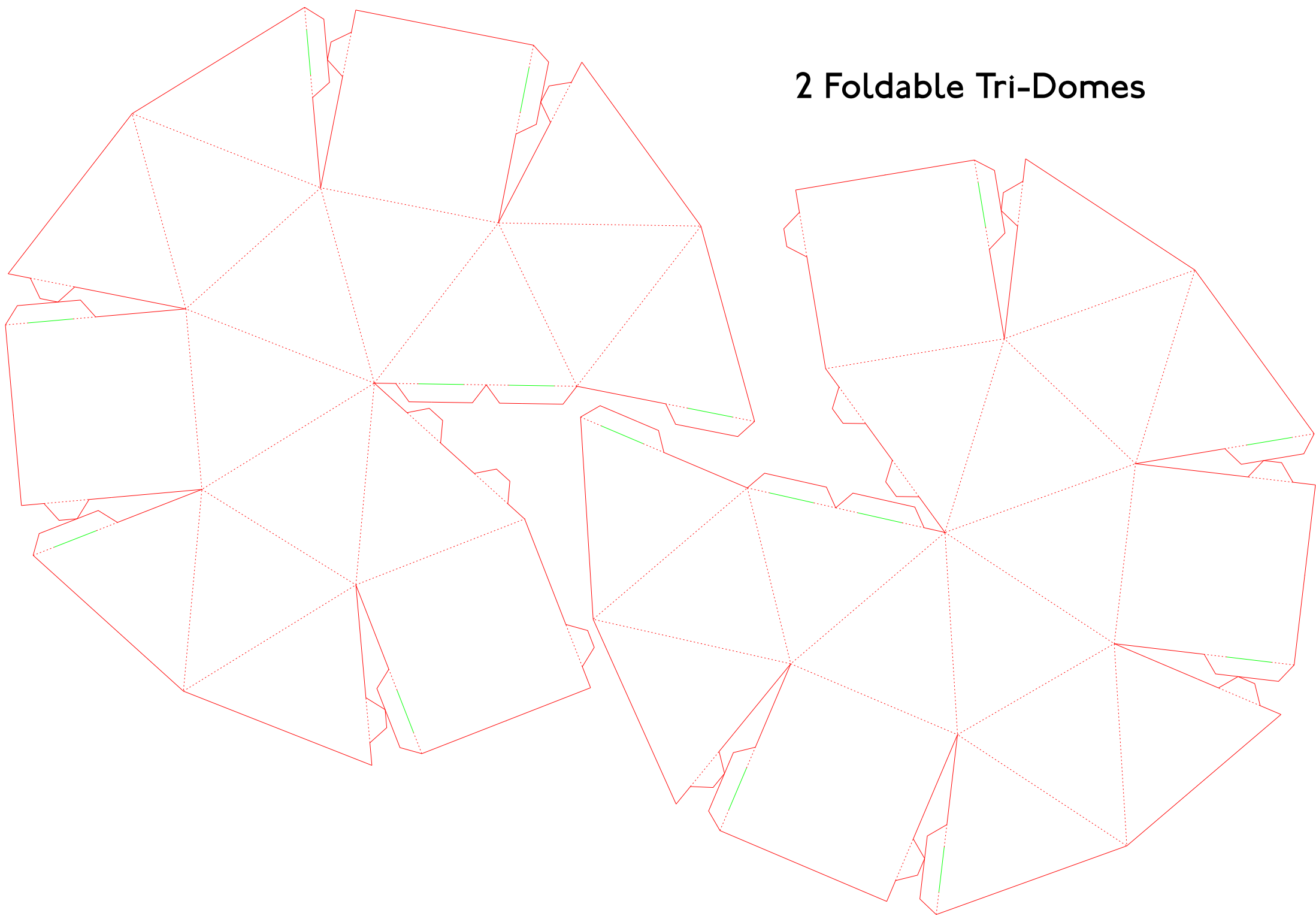Lasercut with a thin line for red and thick for green.
Fold back each dotted line.
Insert tabs into green line slots.
Profit.

2 Foldable Tri-Domes

Foldable Quad-dome