Polysticks can be used to model nets of a (not necessarily convex) polyhedron with square faces, by thinking of the vertices of the polystick as faces of a polycube and the edges of the polystick as Scotch tape connecting two faces at an edge.
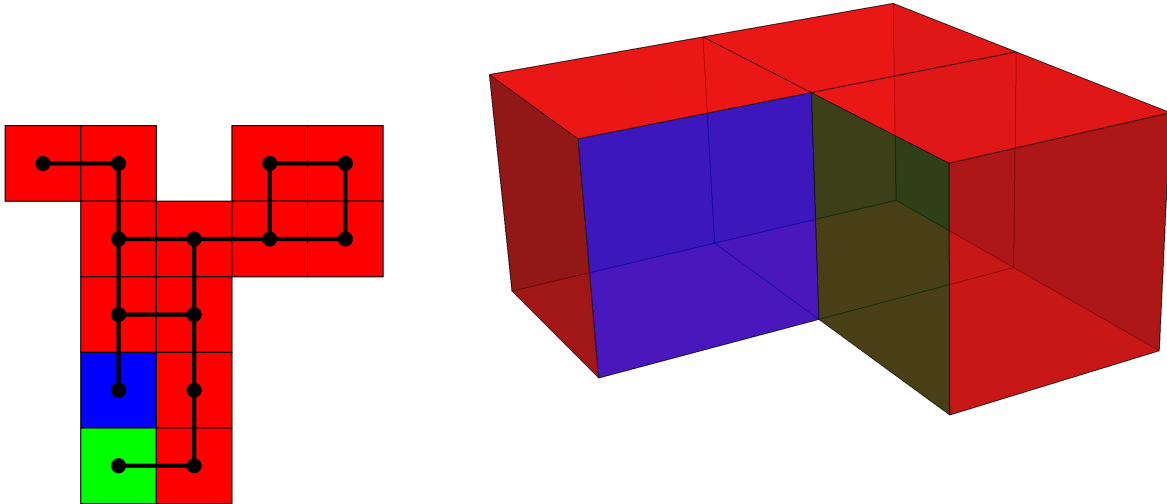

Figure 1: A polystick with 15 edges that models a net of a polycube.

Question. Which polysticks can be used to realize a polyhedron with square faces?

Related.

1. Is there a computationally efficient algorithm of determining whether a given polystick can be folded into a polyhedron?

2. Is there a computationally efficient algorithm of determining the number of ways a given polystick can be folded into a polyhedron?

3. How many polysticks can be folded into a rigid structure with no degrees of freedom?

4. What if we model polyhedra with triangular faces instead? Pentagonal?

References.

https://en.wikipedia.org/wiki/Polystick