College of Charleston

Math Meet 2011

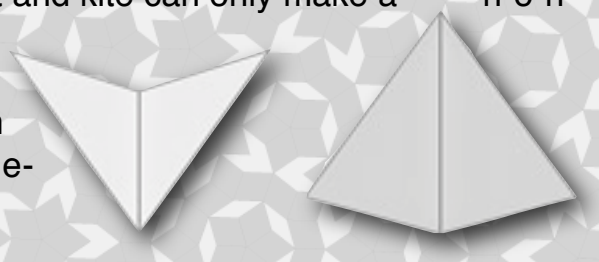
All Day Sprint: The Penrose Path

Directions: On the back of this page you'll find a network of triangles, some of which have numbers inside. Your job is to draw a single loop that follows the dotted edges and obeys the rule that if a triangle has a number in it, then exactly that many of the triangle's edges are part of the loop. Triangles with no numbers inside are unconstrained.

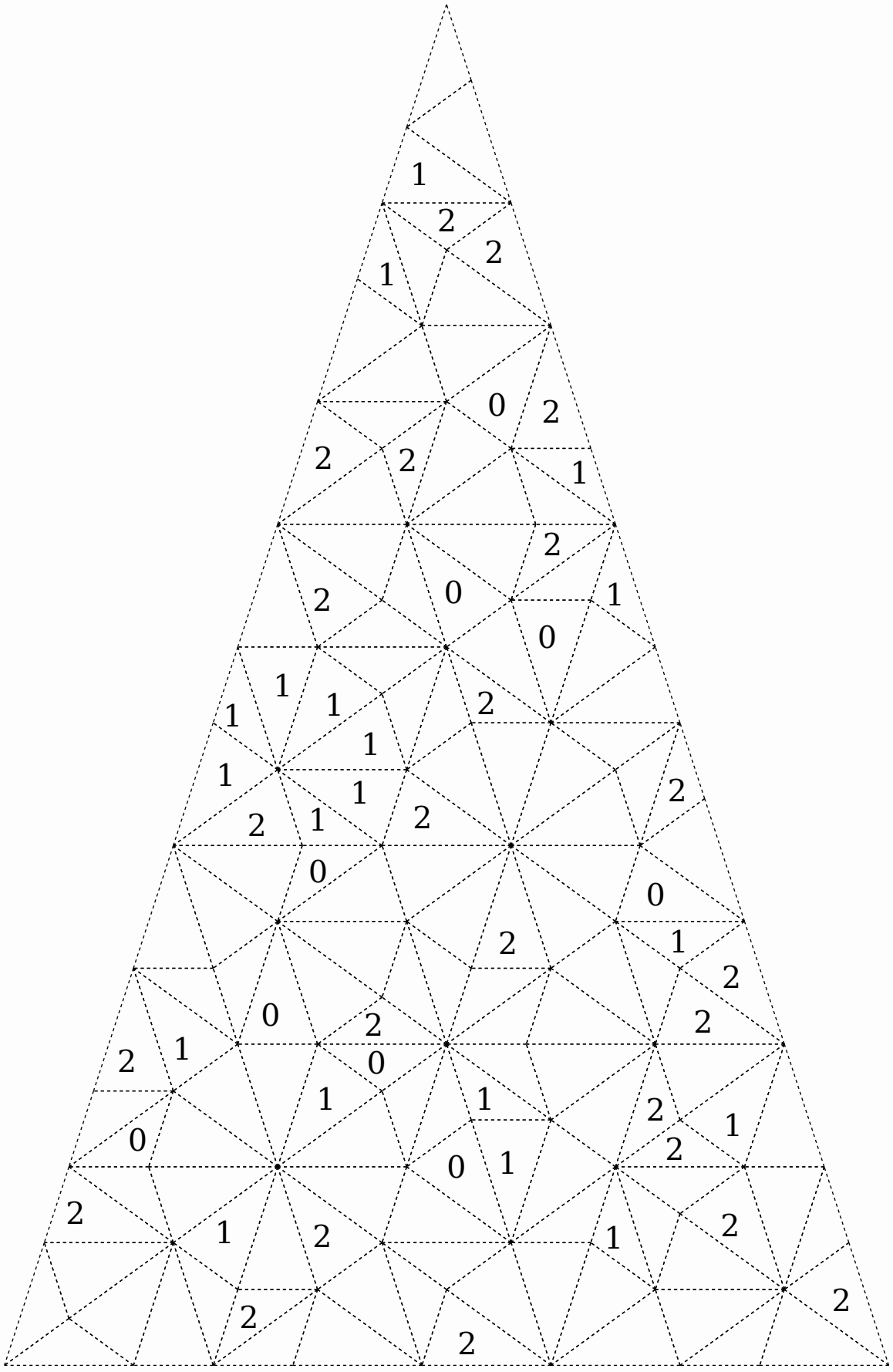
The loop wanders all over the network, but comes back to where it starts. There are no loose ends. At each vertex, either none or exactly two of the edges coming into that vertex are part of the loop.

You must also shade in the inside of the loop. It might help you as you work to keep track of which triangles are definitely inside and which are outside.

The particular pattern of polygons which make up this "slitherlink puzzle" is based on the **dart** and **kite** first discovered by the mathematical physicist, Roger Penrose. (See below right.) If one continues placing darts and kites next to each other in the right way, it is possible to cover an entire infinite plane. Since this is like tiling a floor, it is called a "Penrose Tiling". However, unlike real floor tiles which produce a repeating pattern, the dart and kite can only make a non-periodic tiling! Aside from being a very interesting mathematical object, the Penrose Tiling has found an application in science in explaining the bizarre, rule-breaking solids known as "quasi-crystals".



Dart Kite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