

How Squirmfest was Designed

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Squirmfest is a motif that I (Robert) designed to tessellate the plane. It was intended to be the most intricate and complex tessellation motif that I have created. I outline here how I designed Squirmfest so that tessellation enthusiasts might try to create their own motif(s). The method works for any motif.

I began by drawing a grid structure, a semi-regular tessellation of octagons and squares. I then joined a square and an octagon to form a new unit (Figure 1).

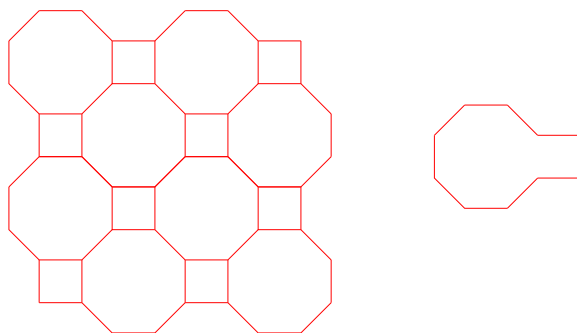


Figure 1: Grid structure – a semi-regular tessellation and new unit

The new unit was then divided into 112 quadrilaterals (squares and rhombuses) in two ways such that the elaborated units were enantiomorphic (mirror images) (Figure 2). The quadrilaterals in both enantiomorphic units were assigned the numbers 1 to 112 (Figure 3). The enantiomorphic units were numbered in black and grey respectively for clarity. The enantiomorphic units were duplicated to give a total of four units that were combined such that the resultant module could tile the plane (Figure 4). Note that both enantiomorphic units appear in two orientations at 180° to each other.

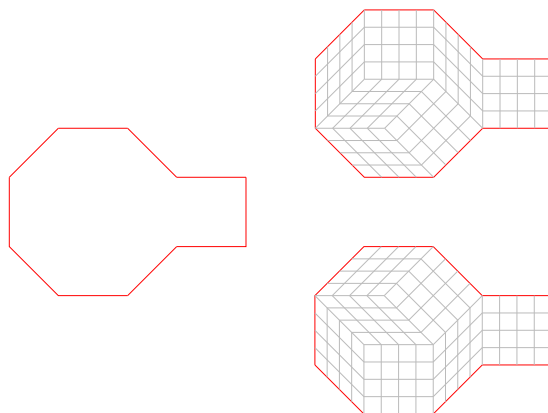


Figure 2: Enantiomorphic elaborated units containing 112 quadrilaterals

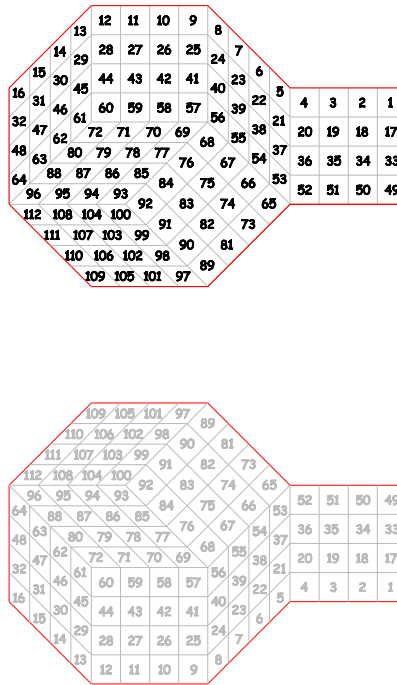


Figure 3: Numbered enantiomorphous elaborated units

To create the Squirmfest motif I chose 112 (the number of quadrilaterals in an elaborated unit) edgewise-connected quadrilaterals (Figure 5) according to the following criteria:

- the quadrilaterals did not have to reside within the same elaborated unit;
- when moving across different elaborated units no numbered quadrilateral was used a second (or more) time(s) - I used a checklist of the numbers 1 through to 112 to prevent this occurrence;
- all 112 areas numbered 1 through to 112 were used; no enclosed areas were created.

The resultant four Squirmfest motifs for tiling the plane were drawn. Note the two enantiomorphs each in two orientations (enantiomer 1 – red and green; enantiomer 2 – blue and yellow) (Figure 6). Note how the numbering in all four motifs is similar. The red, blue, yellow and green motifs were then combined to provide the module ready to tile the plane (Figure 7). Note how the module sits on the modified grid. 18 modules were used in the illustrated Squirmfest tessellation (Figure 8).

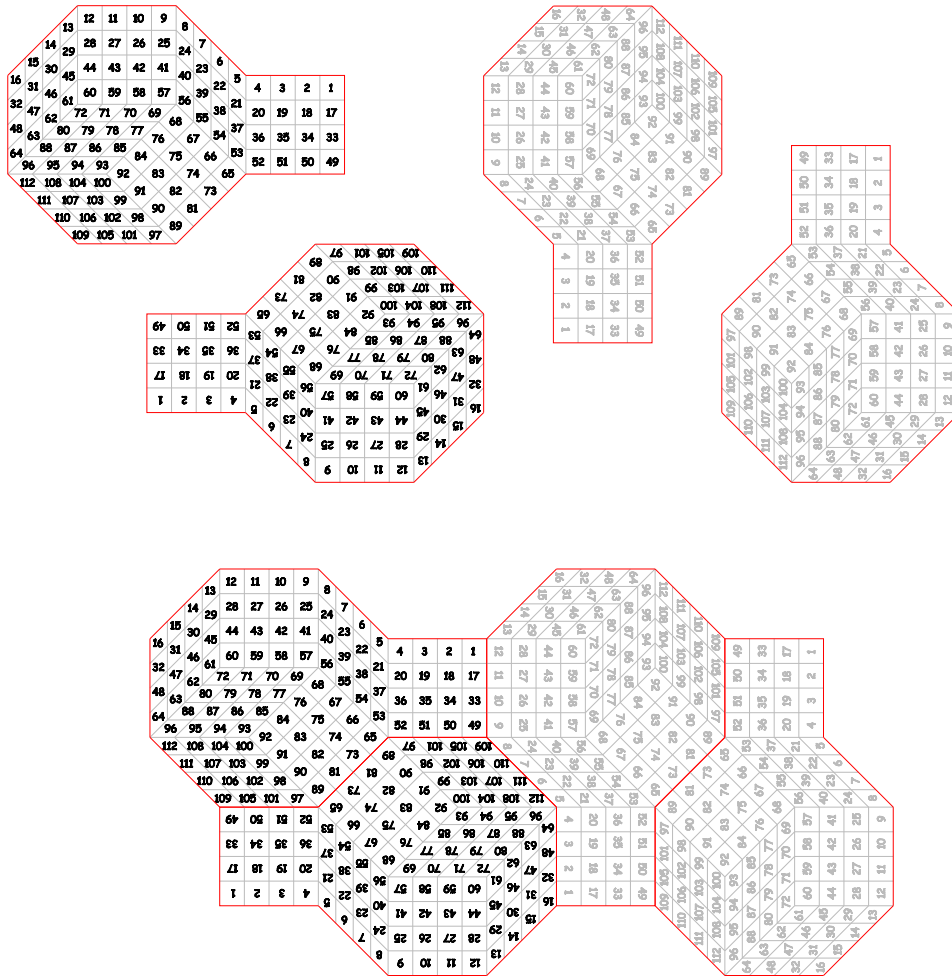


Figure 4: Combination of four units into a module

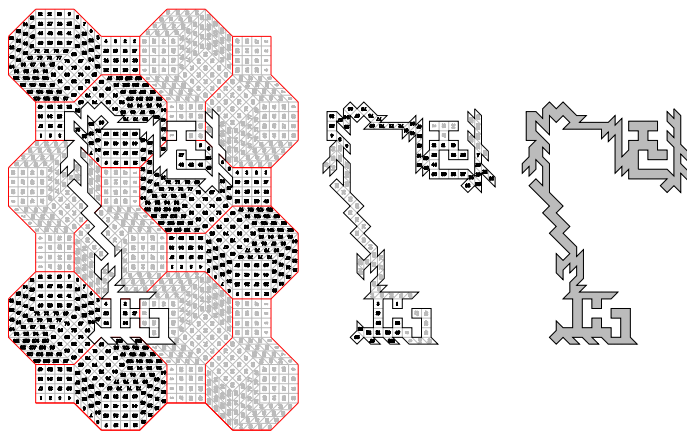


Figure 5: Creation of the Squirmfest motif

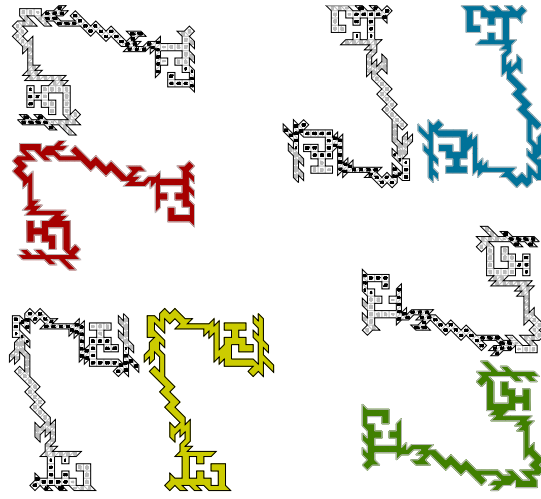


Figure 6: Four Squirmfest motifs – two enantiomorphs each in two orientations

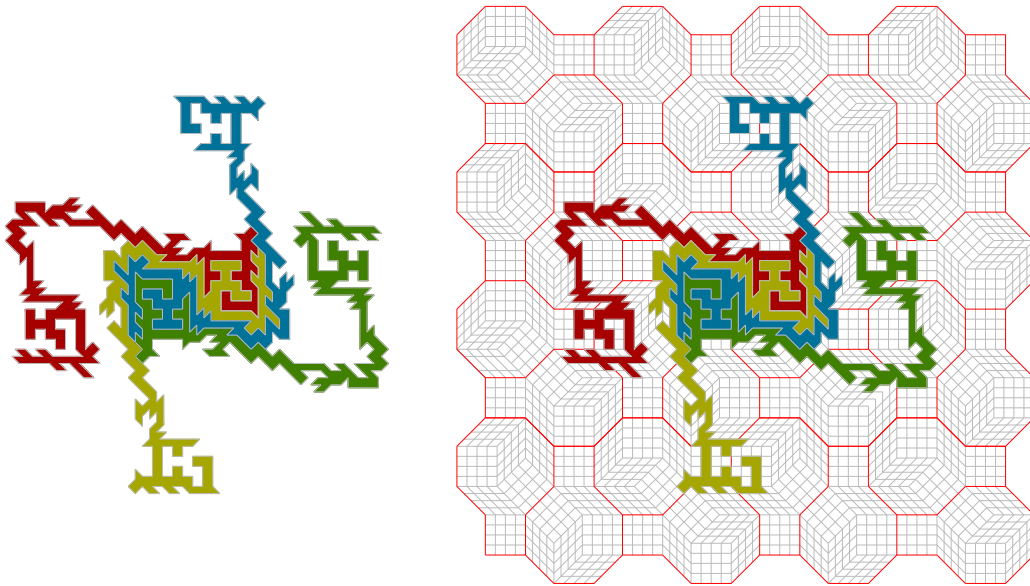


Figure 7: Squirmfest module

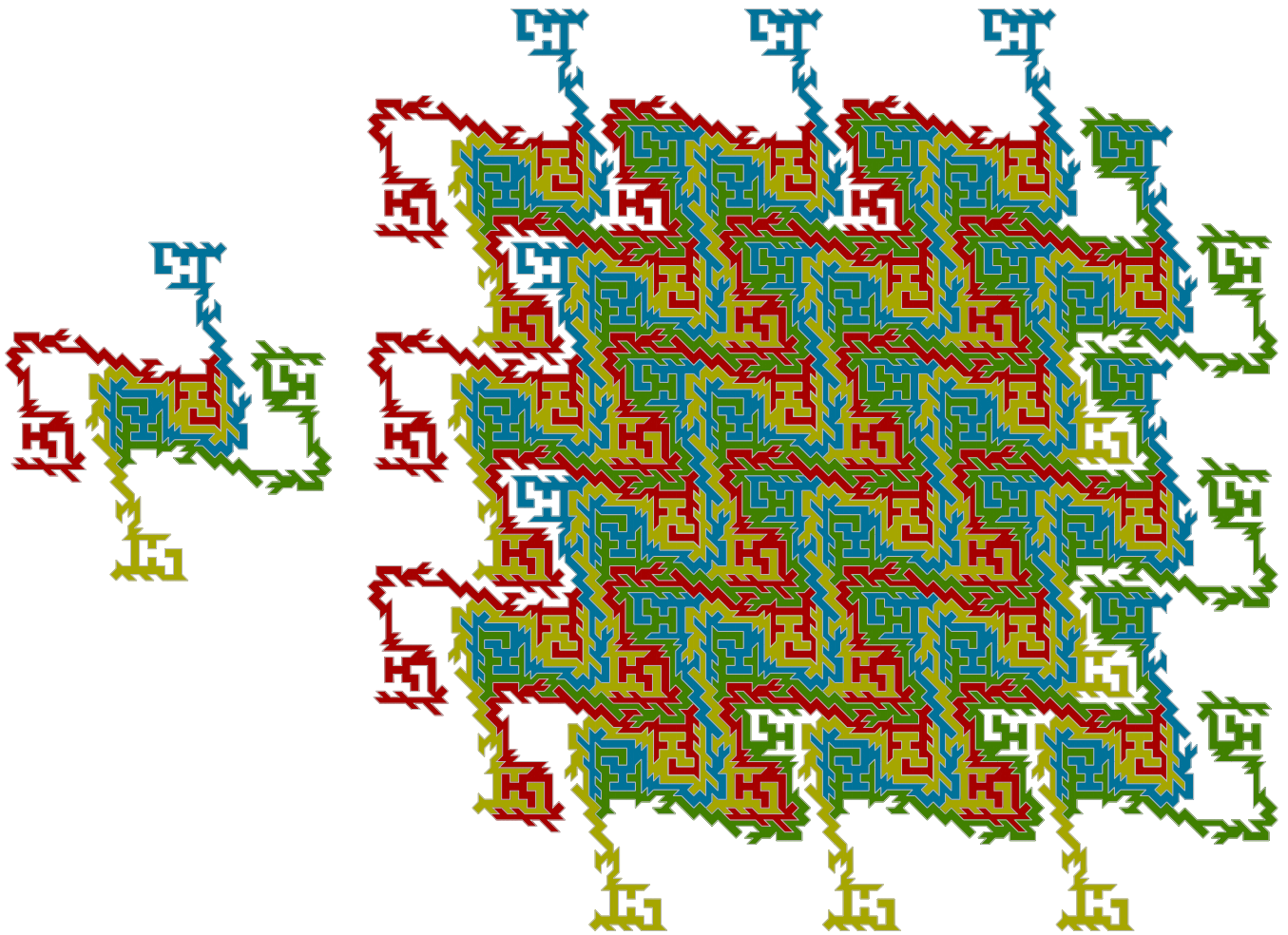


Figure 8: Squirmfest tessellation