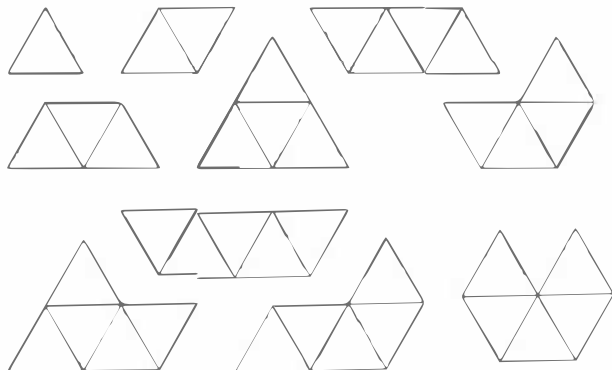


Polyiamond Compatibility

Richard Mah, Ryan Nowakowski and William Wei

A *polyiamond* is a connected plane figure formed by joining unit equilateral triangles edge to edge. Figure 1 shows the moniamond, the diamond, the triamond, three tetriamonds (in the shapes of A, I and V) and four pentiamonds (in the shapes of A, I, J and U).

Figure 1



A polyiamond X is said to be a *multiple* of another polyiamond Y if a copy of X can be assembled from copies of Y. A polyiamond is said to be a *common multiple* of two other polyiamonds if it is a multiple of both. If two polyiamonds have common multiples, they are said to be *compatible*.

Given two polyiamonds, even relatively small ones, it is not always easy to determine whether they are compatible. Here, we investigate the compatibility of polyiamonds up to the pentiamonds.

The moniamond is trivially compatible with every polyiamond. Figures 2a and 2b show that the diamond is compatible with the triamond, all three tetriamonds and all four pentiamonds.

Figure 2a



Figure 2b

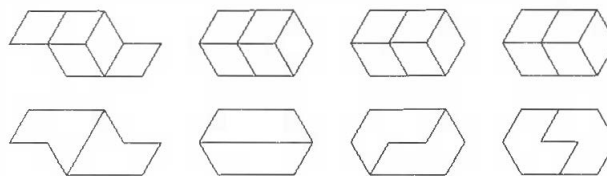


Figure 3 shows that the triamond is compatible with all three tetriamonds and four pentiamonds.

Figure 3

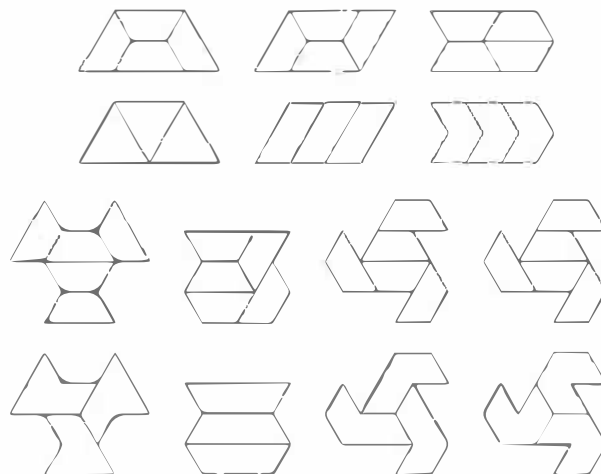
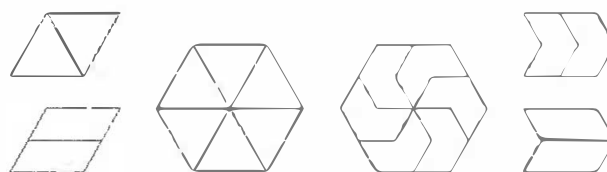


Figure 4 shows that the tetriamonds are compatible with one another.

Figure 4



The compatibility of the A-tetramond with the pentiamonds is the most difficult case. We believe that it is not compatible with the U-pentiamond. However, we do not have a proof. On the other hand, Figure 5 shows that it is compatible with the other three pentiamonds.

Figure 5

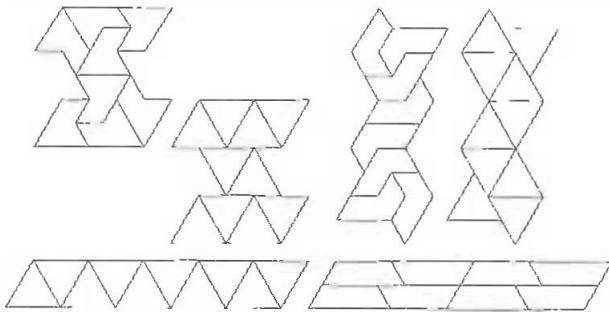


Figure 6 shows that the I-tetramond is compatible with all four pentiamonds.

Figure 6

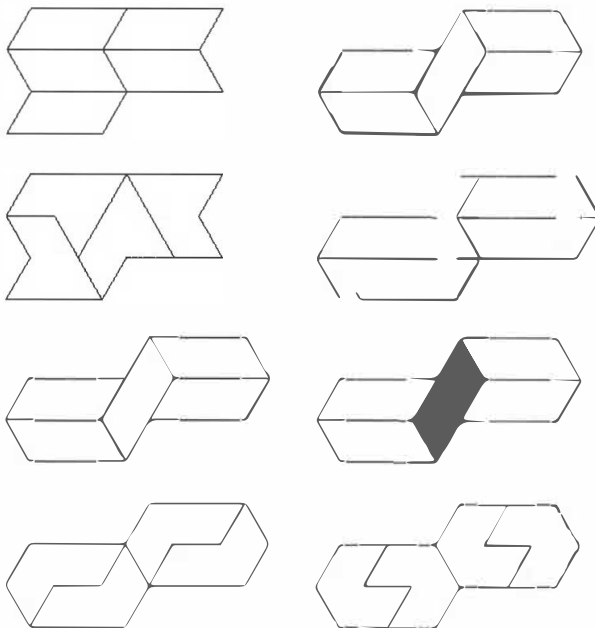


Figure 7 shows that the V-tetramond is compatible with all four pentiamonds.

Figure 7

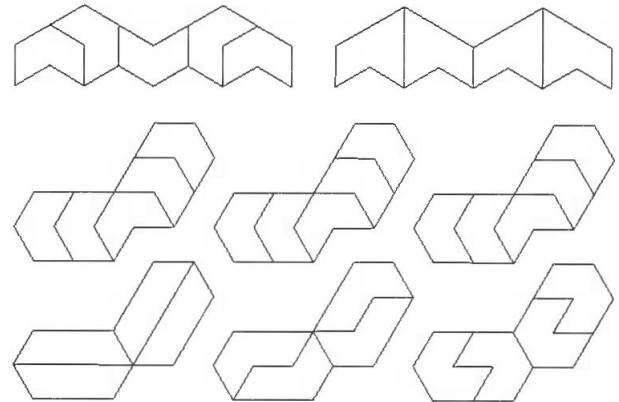
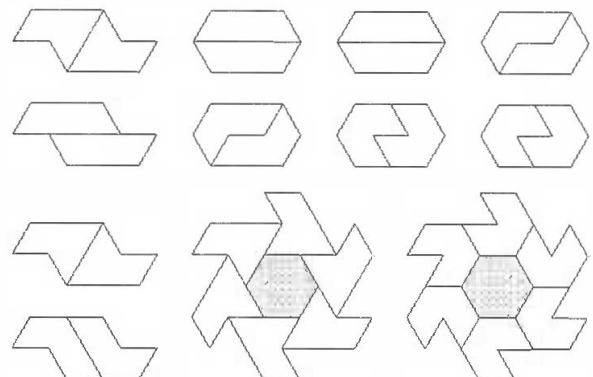


Figure 8 shows that the pentiamonds are compatible with one another.

Figure 8



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