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Minimum Area Polyomino Venn Diagrams

Minimum area polyVenn diagrams are Venn diagrams in which each of the 2^n intersection regions, in a diagram of n polyominoes, consists of one unit square.

We construct minimum area polyVenn diagrams in bounding rectangles of size $2^r \times 2^c$. Our construction depends on two "expansion" results. First, a polyVenn in a $2^2 \times 2^c$ rectangle can be expanded to produce another one that fits into a $2^2 \times 2^{c+3}$ bounding rectangle. Second, a minimum area polyVenn diagram in a $2^r \times 2^c$ rectangle can be expanded to produce another one that fits into a $2^{r+1} \times 2^{c+1}$ rectangle.