

Quilt Pattern Symmetries

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A Nice Quote

“A mathematician, like a painter or poet, is a maker of patterns. If his patterns are more permanent than theirs, it is because they are made with ideas.” — G. Hardy (from *A Mathematician's Apology*, London 1941).

A First Look at Some Quilts



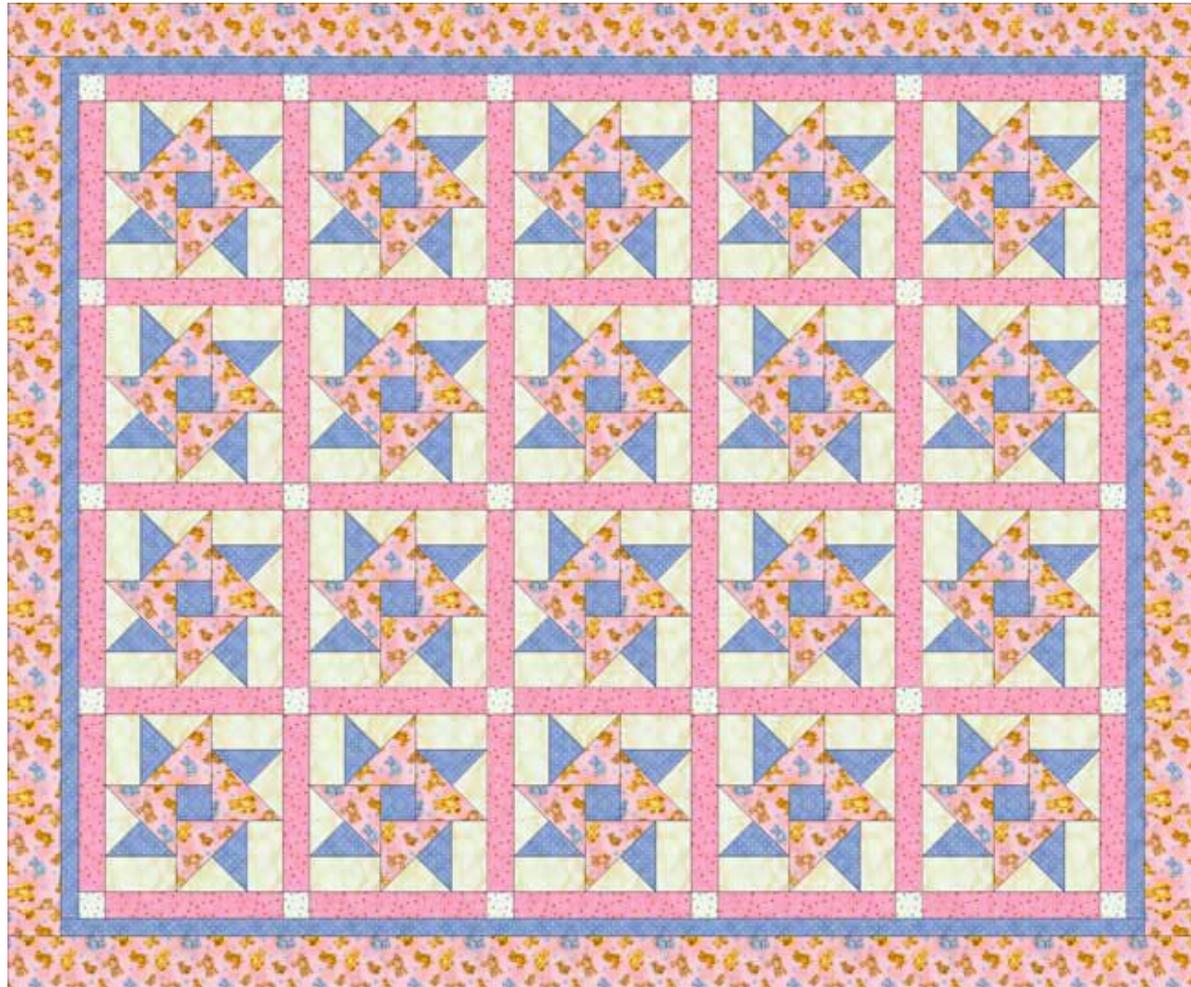
A First Look at Some Quilts



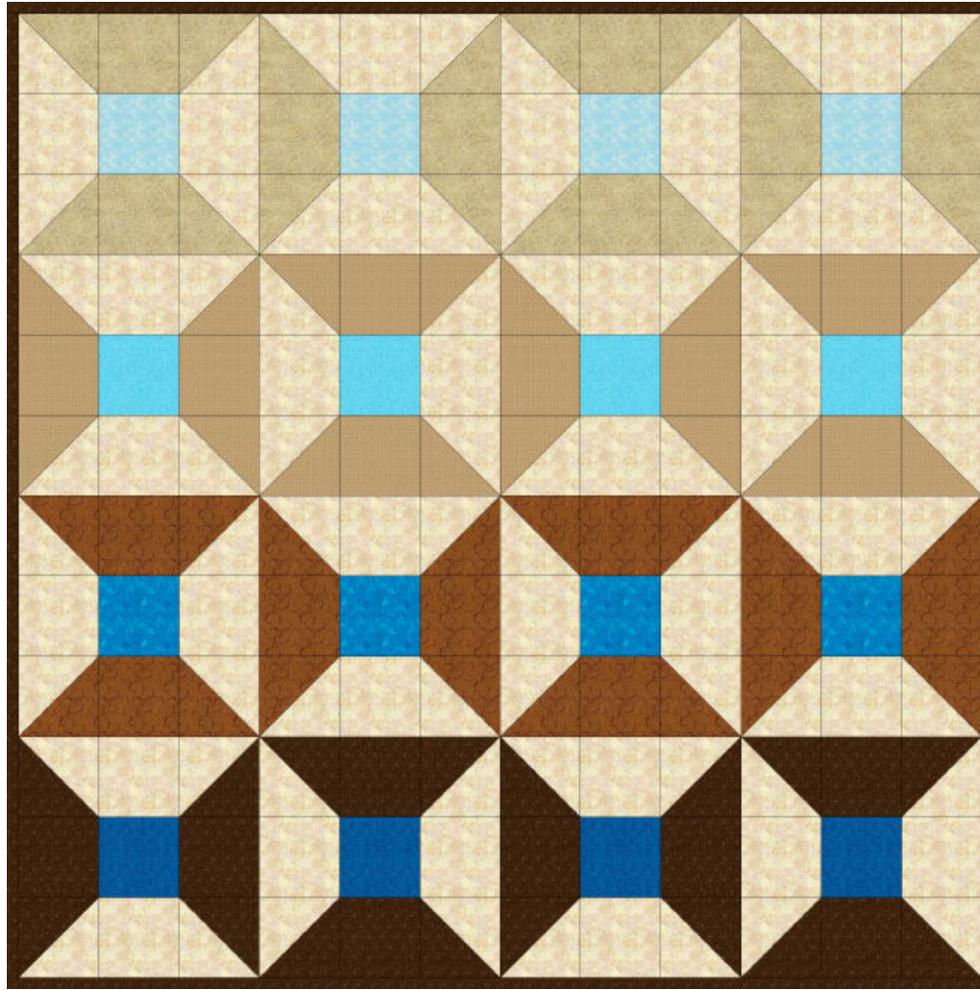
A First Look at Some Quilts



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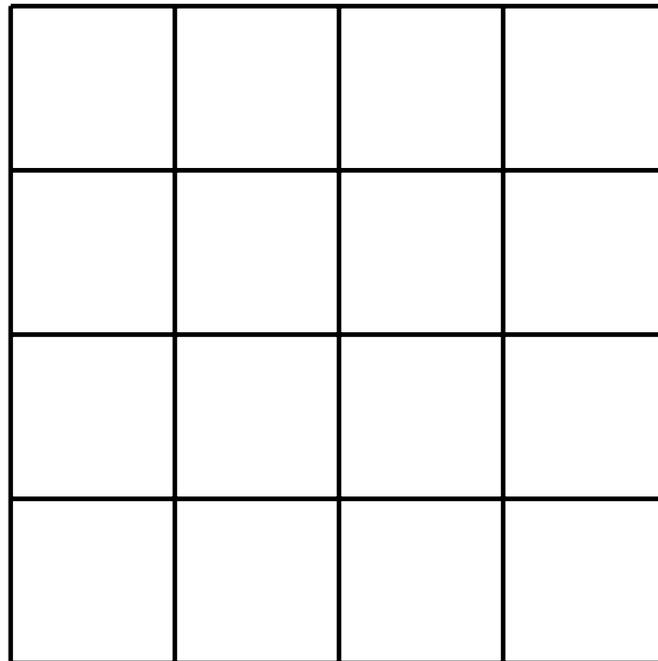


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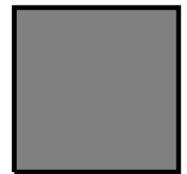
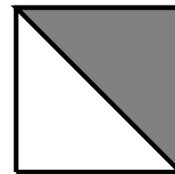
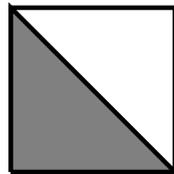
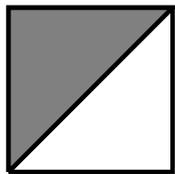
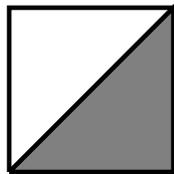
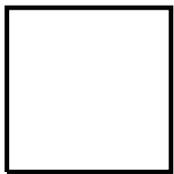
“Mathematize” the Quilt Block

Start with a 4 by 4 square grid



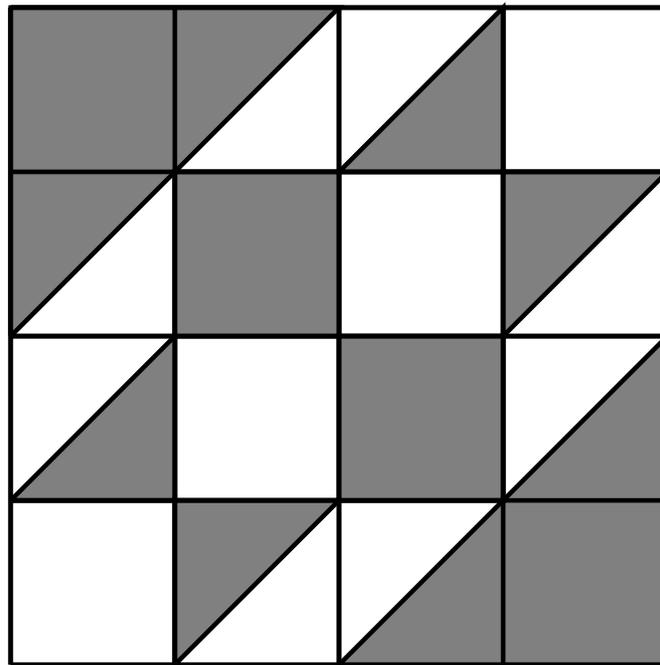
“Mathematize” the Quilt Block

Fill each square one of six ways

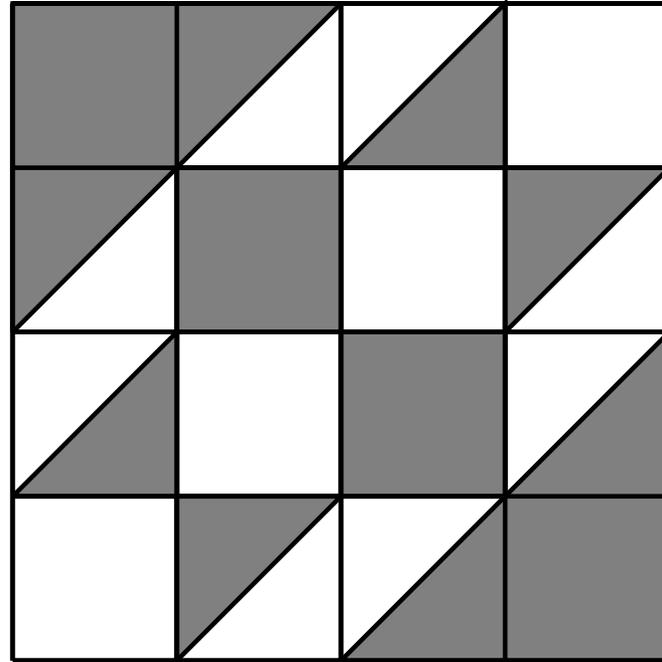


“Mathematize” the Quilt Block

For example:

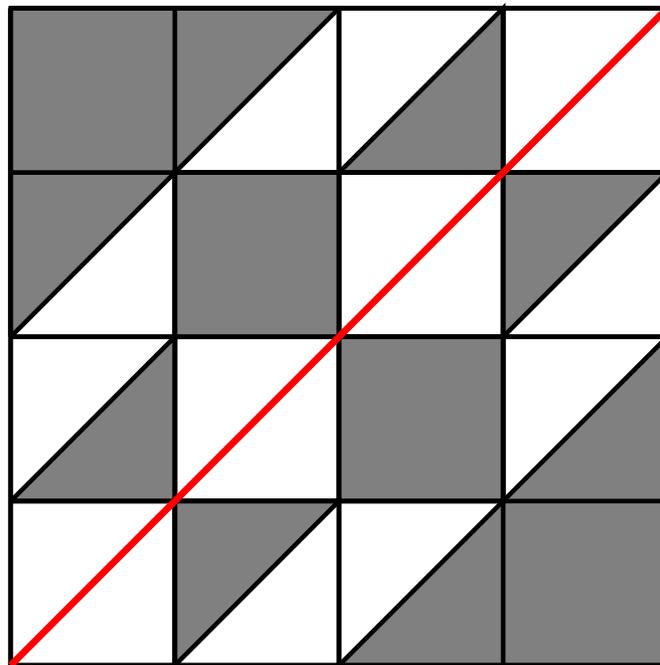


Make Your Own Quilt Block



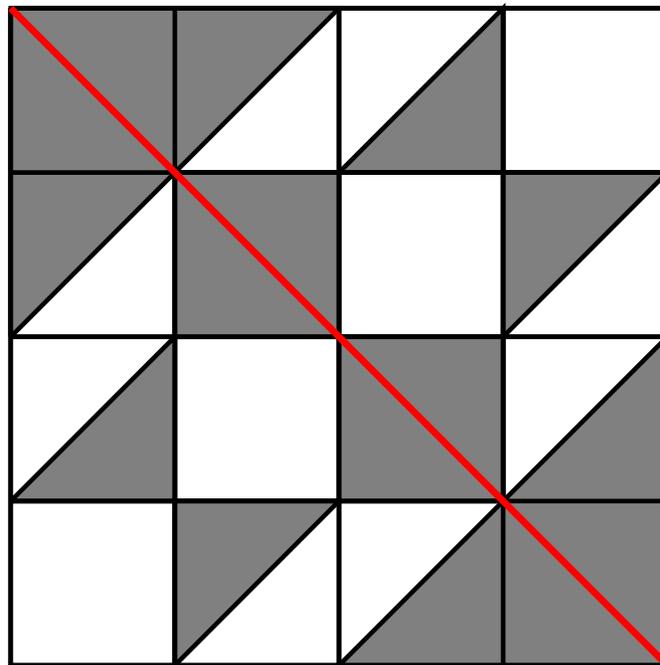
Categorizing Quilt Blocks By Symmetries

Reflection Symmetries: Diagonal One



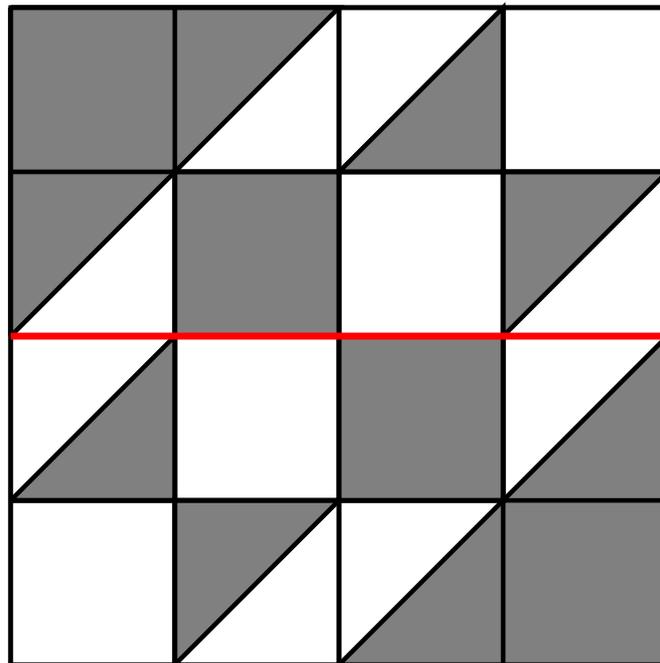
Categorizing Quilt Blocks By Symmetries

Reflection Symmetries: Diagonal Two



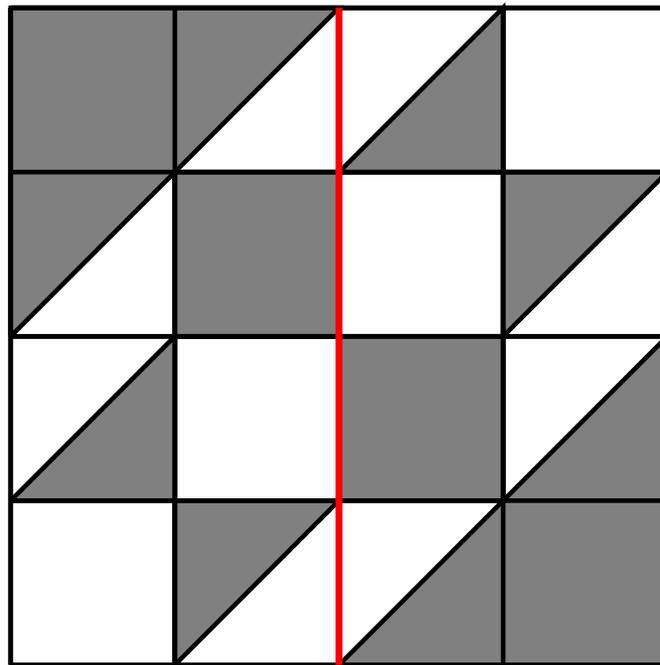
Categorizing Quilt Blocks By Symmetries

Reflection Symmetries: Across One



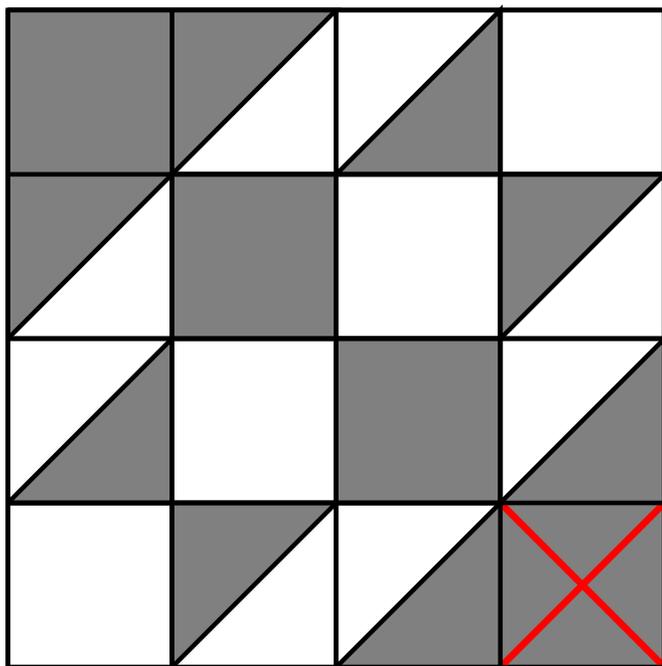
Categorizing Quilt Blocks By Symmetries

Reflection Symmetries: Across Two

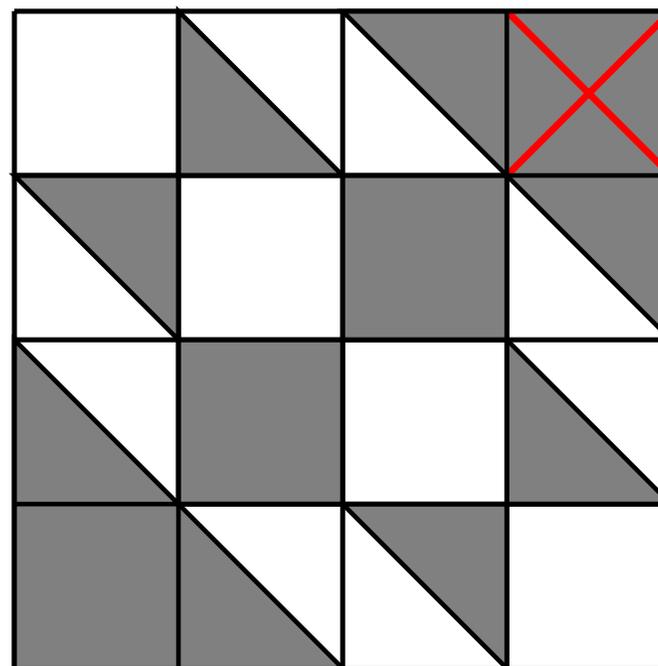


Categorizing Quilt Blocks By Symmetries

Turn Symmetries: 90 Degree



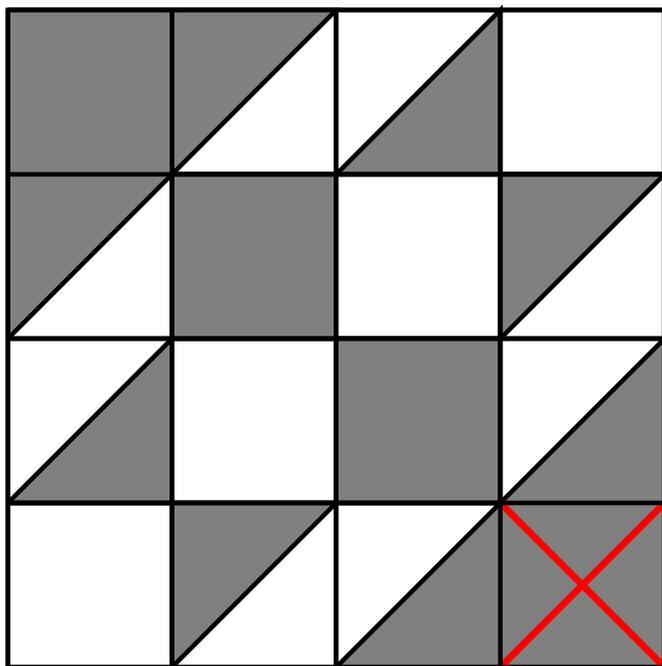
Original



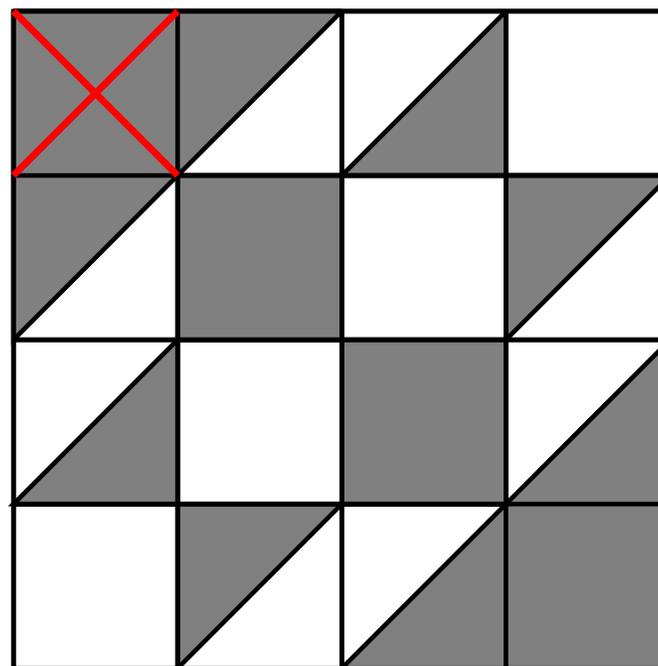
90 Degree Rotation

Categorizing Quilt Blocks By Symmetries

Turn Symmetries: 180 Degree



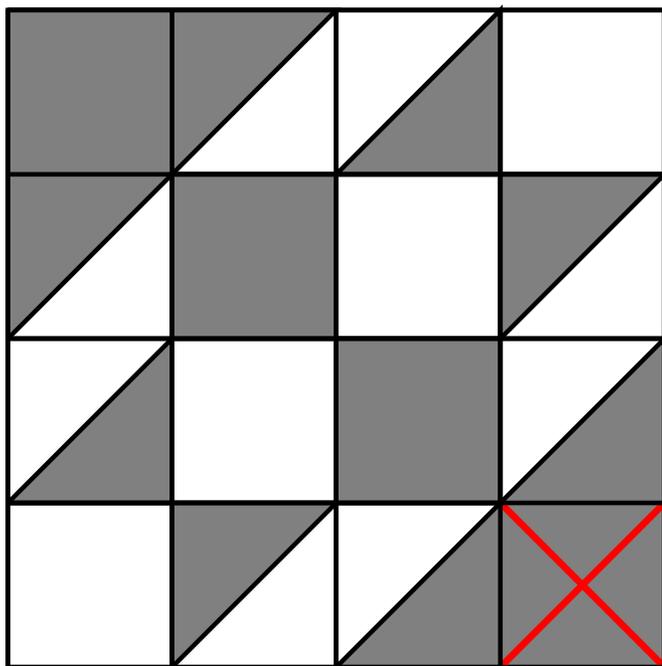
Original



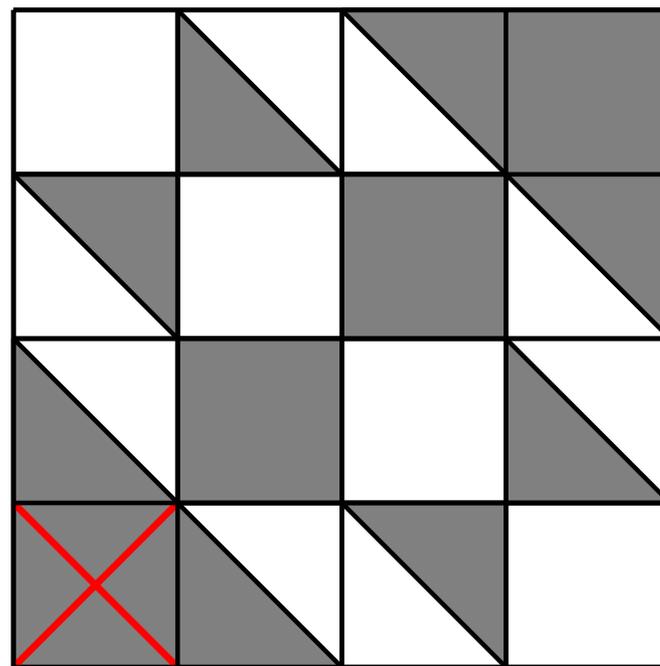
180 Degree Rotation

Categorizing Quilt Blocks By Symmetries

Turn Symmetries: 270 Degree



Original



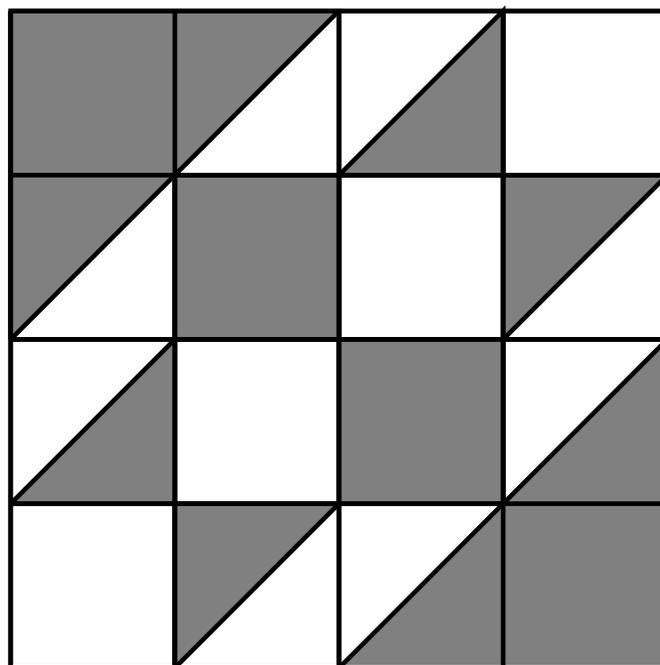
270 Degree Rotation

Categorizing Quilt Blocks By Symmetries

Symmetry Group

2 Diagonal Reflection Symmetries

180 Degree Rotational Symmetry



TYPE: D,D,180

Categorizing Activity

Categorize the 28 quilt block card sets according to their symmetry groups.

Categorizing Activity

Categorize your quilt block according to its symmetries. Does it belong to one of the previously discovered symmetry groups?

Advanced Questions for Independent Study

Are there any other 4 by 4 quilt block symmetry groups that we have not “discovered”?

Advanced Questions for Independent Study

If a quilt block has two lines of symmetry, does it always have 180 degree rotational symmetry?

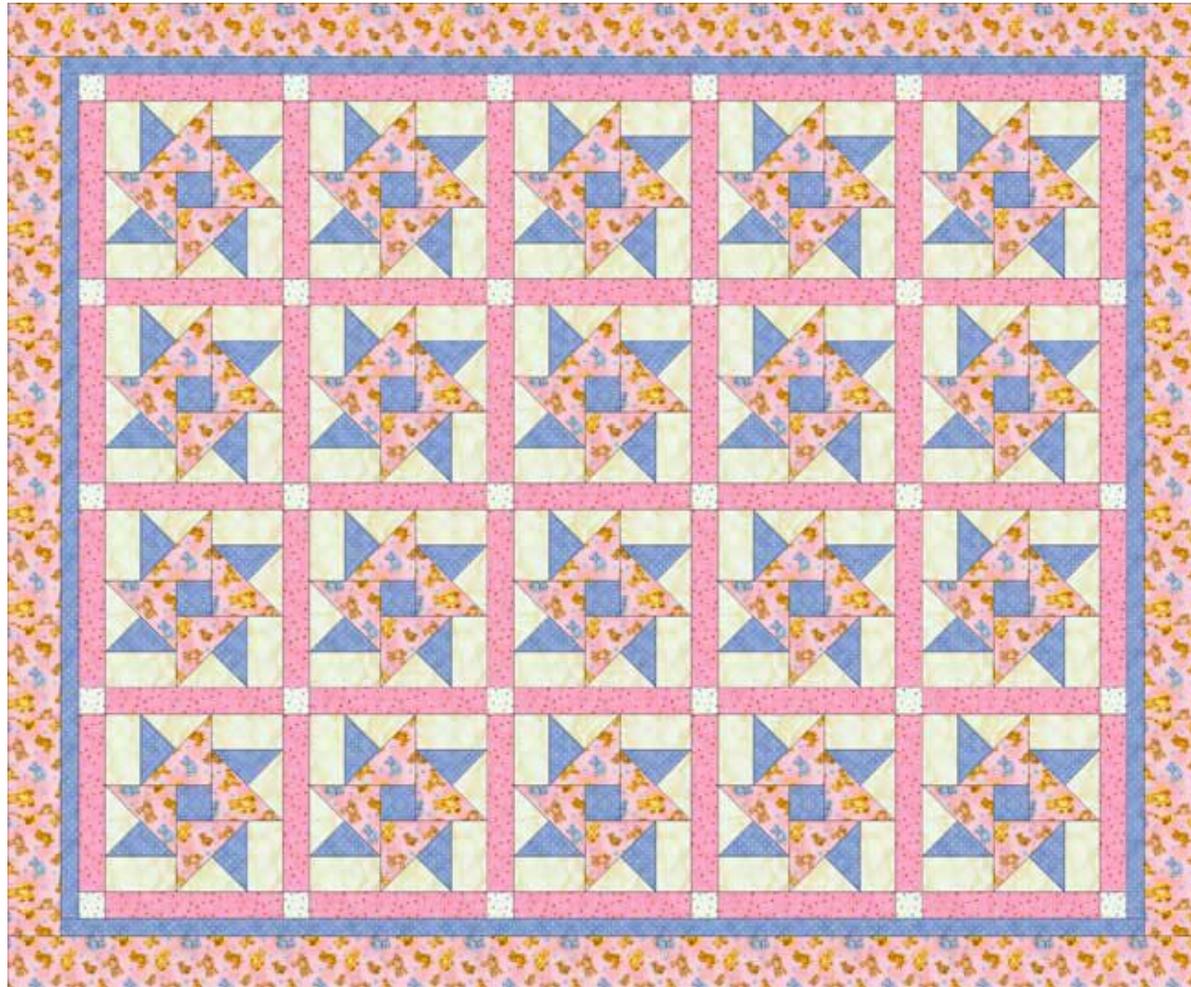
Advanced Questions for Independent Study

How many 4 by 4 quilt blocks exist that possess all the possible rotational and reflective symmetries (i.e. D_4)?

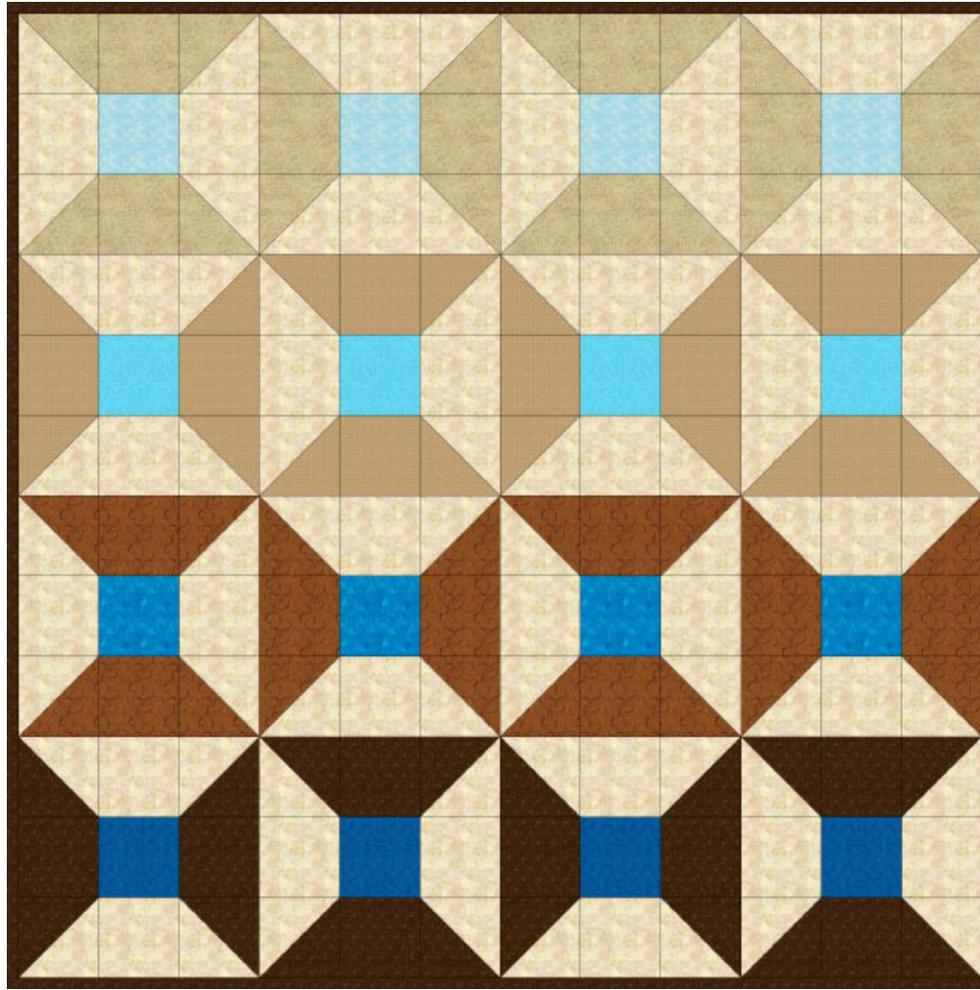
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