

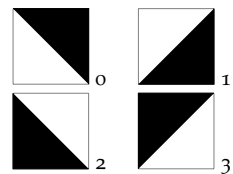
TRUCHET BOOK (I)

4X4 PATTERNS WITH ROTATIONAL
SYMMETRY

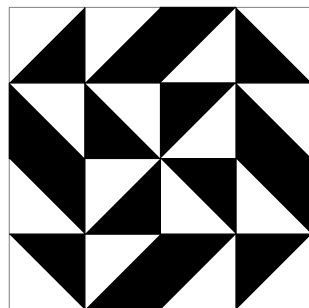
Introduction

This booklet presents a complete listing of 4x4 Truchet tile patterns with rotational symmetry. Truchet tiles are, traditionally, square tiles that are divided by a diagonal line, and coloured with two colours with a different colour on either side of the diagonal. Each tile can be rotated to one of four positions. Patterns are formed by placing tiles next to each other, often rotating tiles to create repeated motifs.

Each 4x4 Truchet tile pattern with rotational symmetry has a core 2x2 pattern in one of its quadrants that is rotated to produce the overall pattern. In this booklet, the core pattern is assumed to be in the lower left. Each pattern can be identified as a sequence of 4 digits *abcd* that list the rotational positions of each tile in the lower left quadrant.



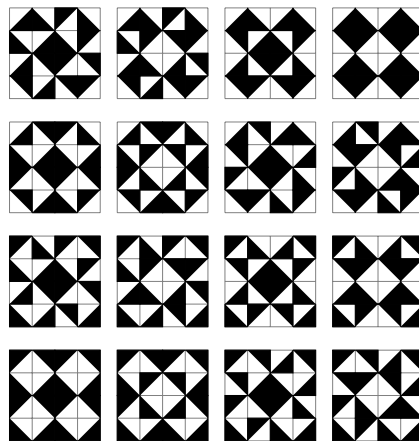
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c	p	p	q
b	d	d	c
a	c	b	a



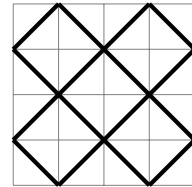
The 0011 pattern

Pattern families

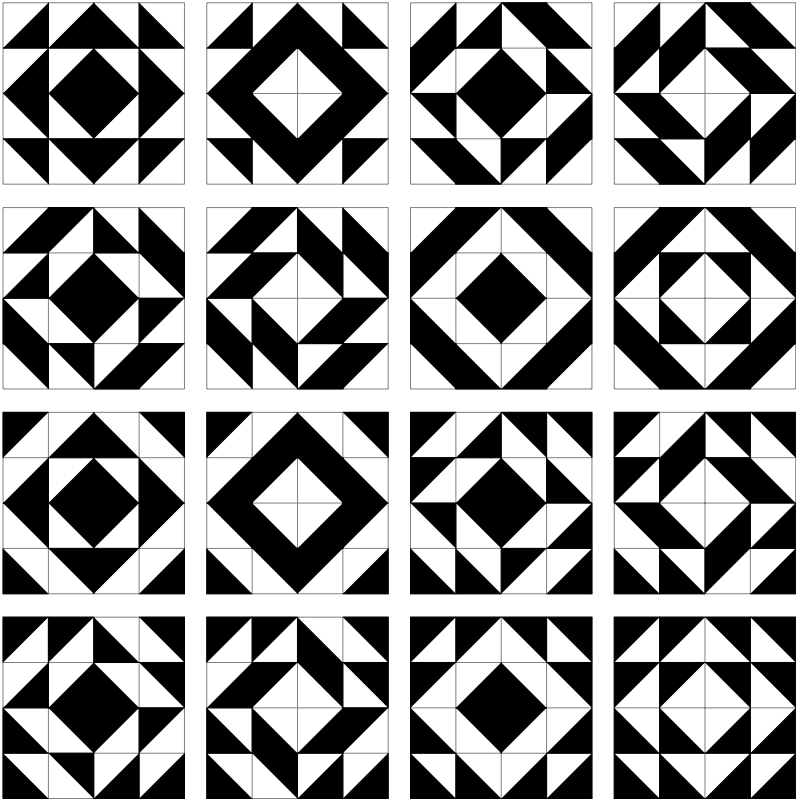
We can group the 4×4 Truchet tile patterns with rotational symmetry into families where tile patterns are considered to be in the same family if they would look the same without colour – if each corresponding tile shares the same diagonal direction. The sequence that represents the family of a tile pattern can be found by taking the sequence of the tile pattern *modulo* 2. So, for example, the 16 tile patterns below are all members of the 0110 family.



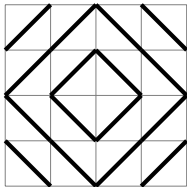
The 0110 pattern family



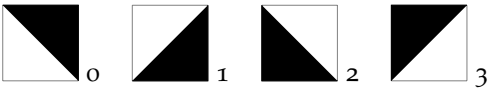
The 0110 family pattern



0000

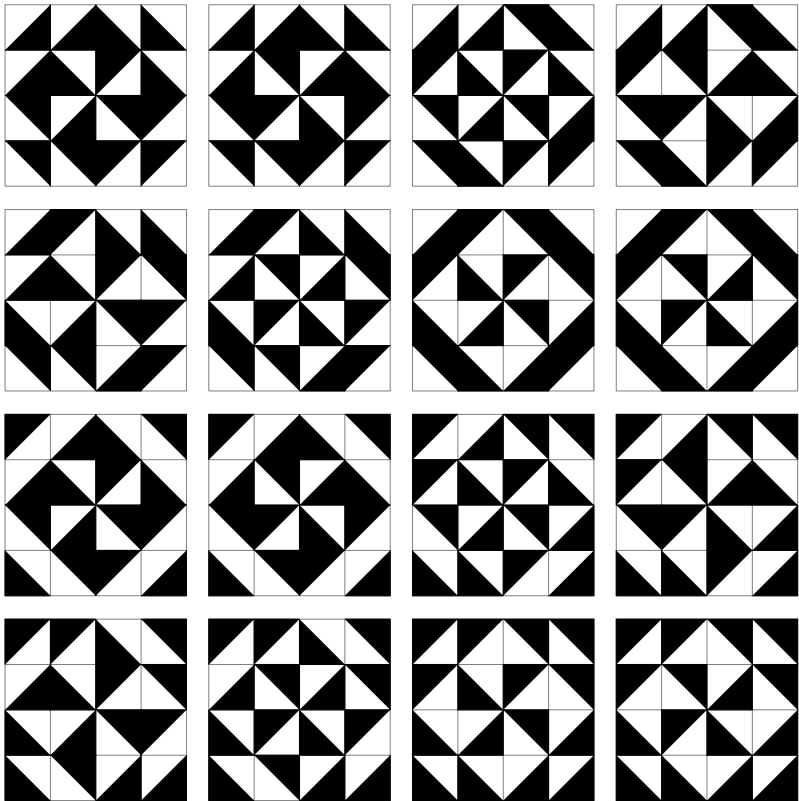
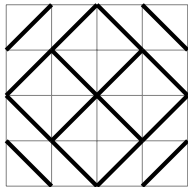


0000 0002 0020 0022
0200 0202 0220 0222
2000 2002 2020 2022
2200 2202 2220 2222

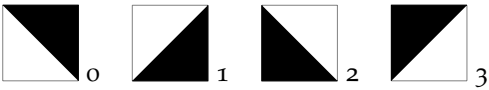


a	p	c	a
c	p	p	p
b	d	d	c
a	c	b	a

0001

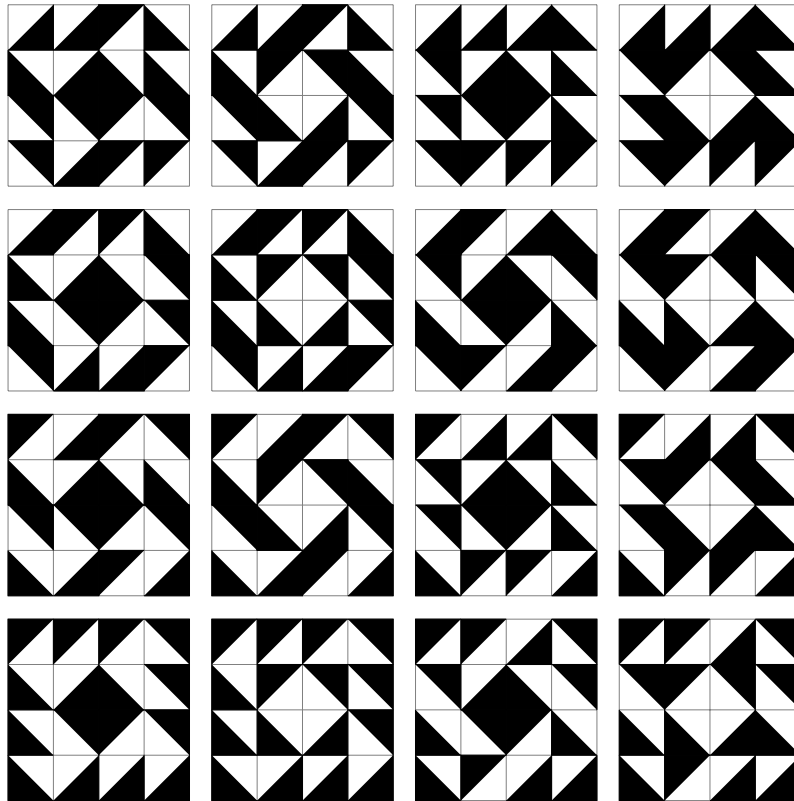
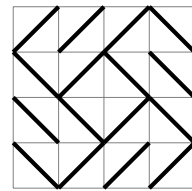


0001 0003 0021 0023
0201 0203 0221 0223
2001 2003 2021 2023
2201 2203 2221 2223

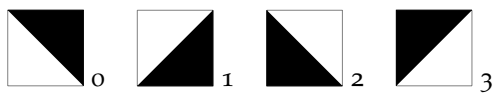


a	p	c	a
c	p	p	p
b	d	d	c
a	c	b	a

0010

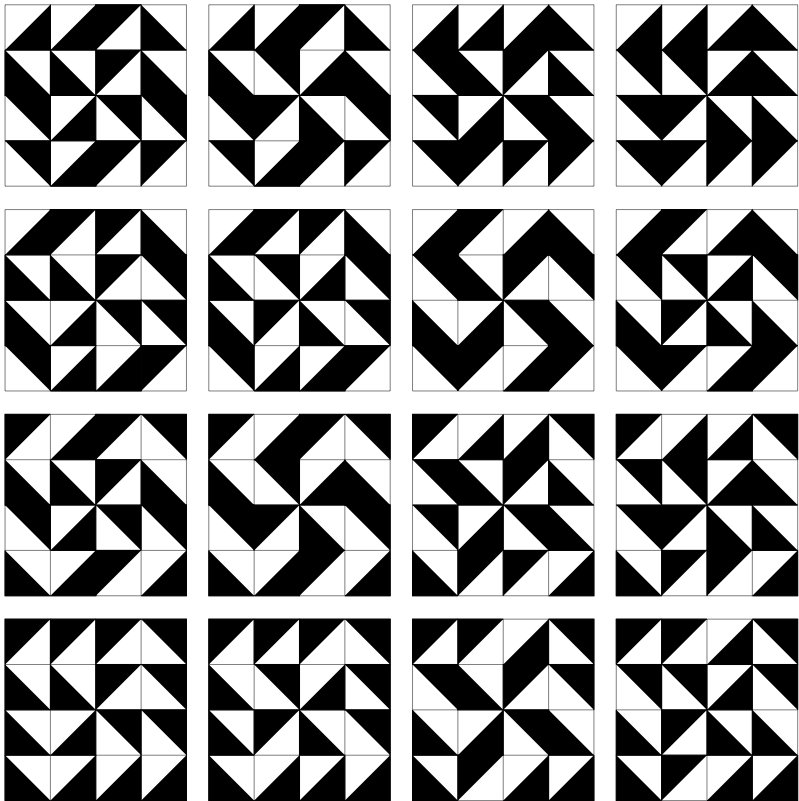
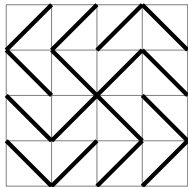


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 0210 0212 0230 0232
 2010 2012 2030 2032
 2210 2212 2230 2232

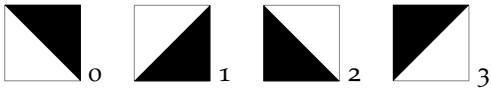


a	p	c	a
c	p	p	p
b	d	d	c
a	c	b	a

0011

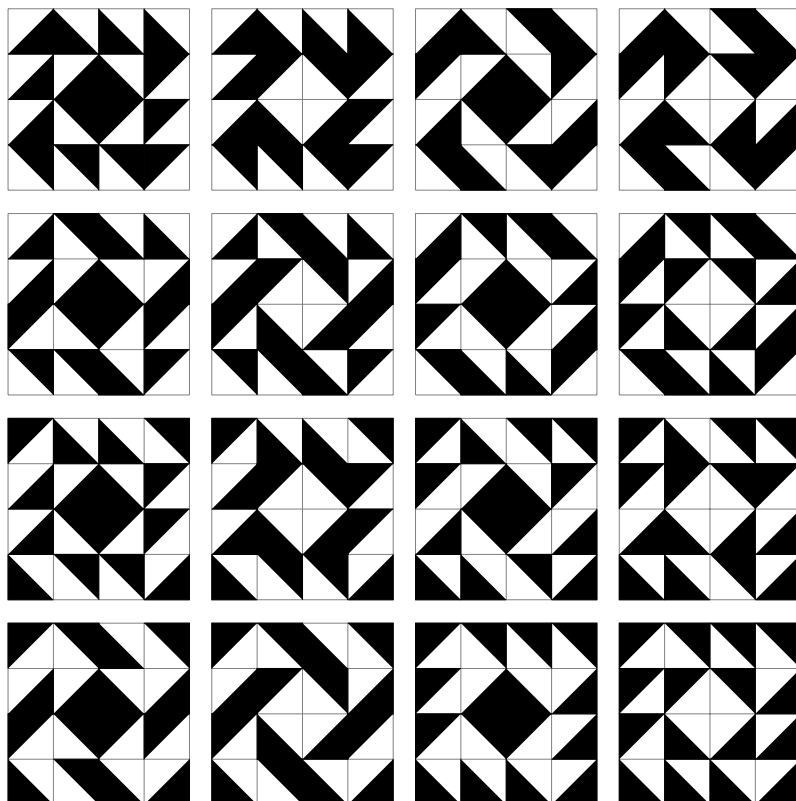
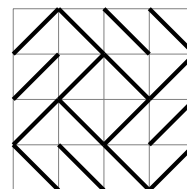


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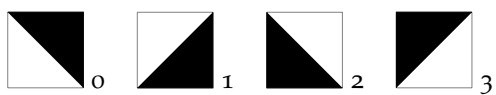


a	q	c	a
c	p	p	q
b	d	d	c
a	c	b	a

0100

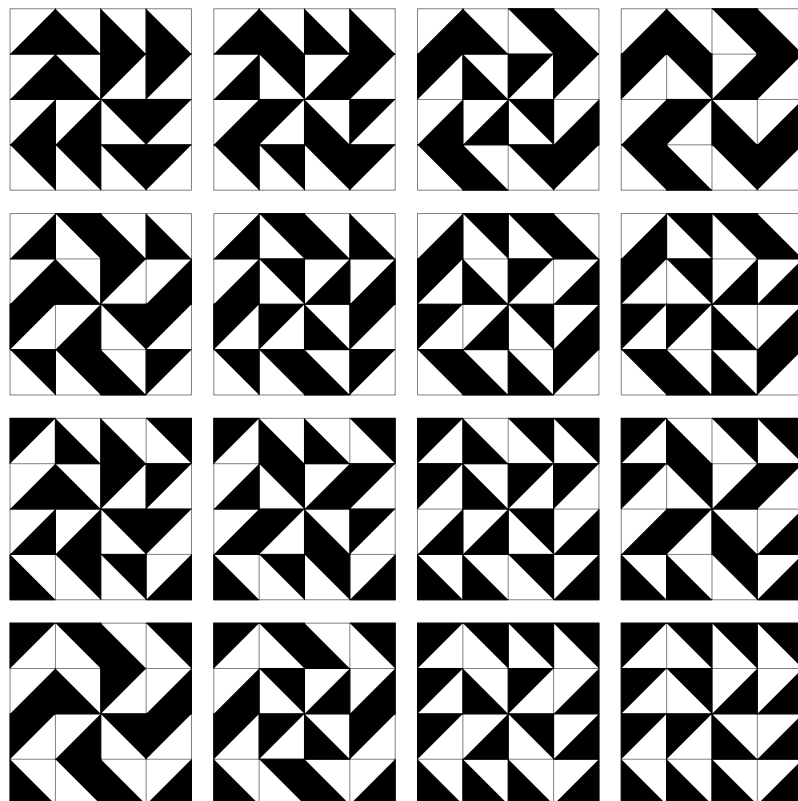
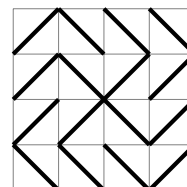


0100 0102 0120 0122
 0300 0302 0320 0322
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 2300 2302 2320 2322

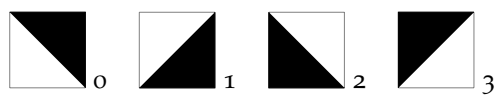


a	p	c	a
c	p	p	p
b	d	d	c
a	c	b	a

0101

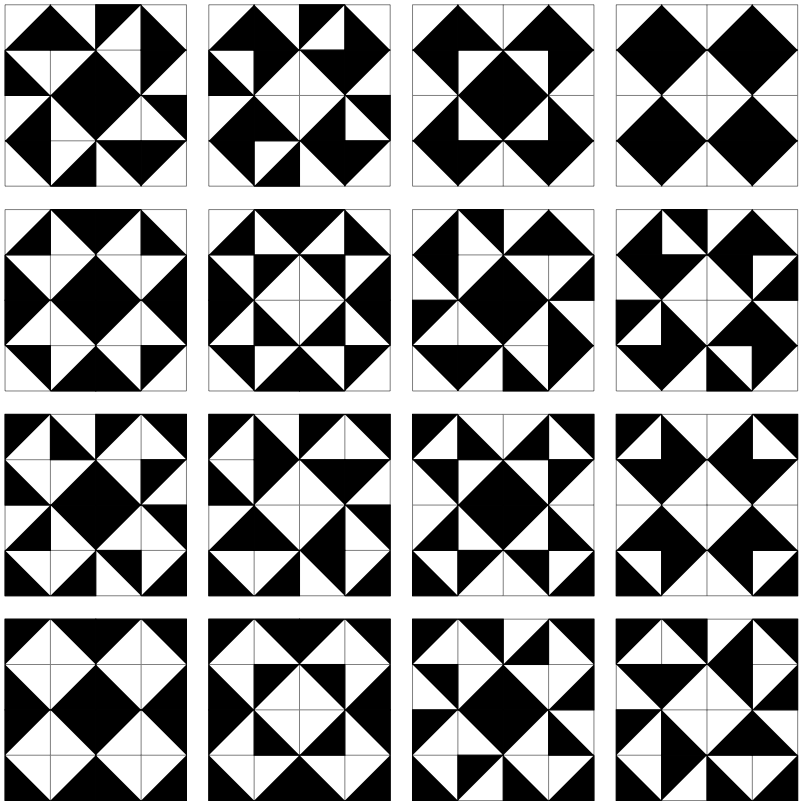
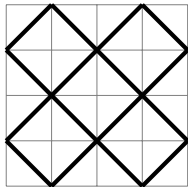


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 0301 0303 0321 0323
 2101 2103 2121 2123
 2301 2303 2321 2323

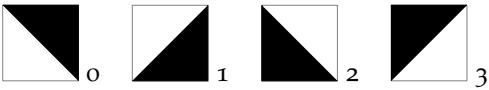


a	q	c	a
c	p	p	q
b	d	d	c
a	c	b	a

0110

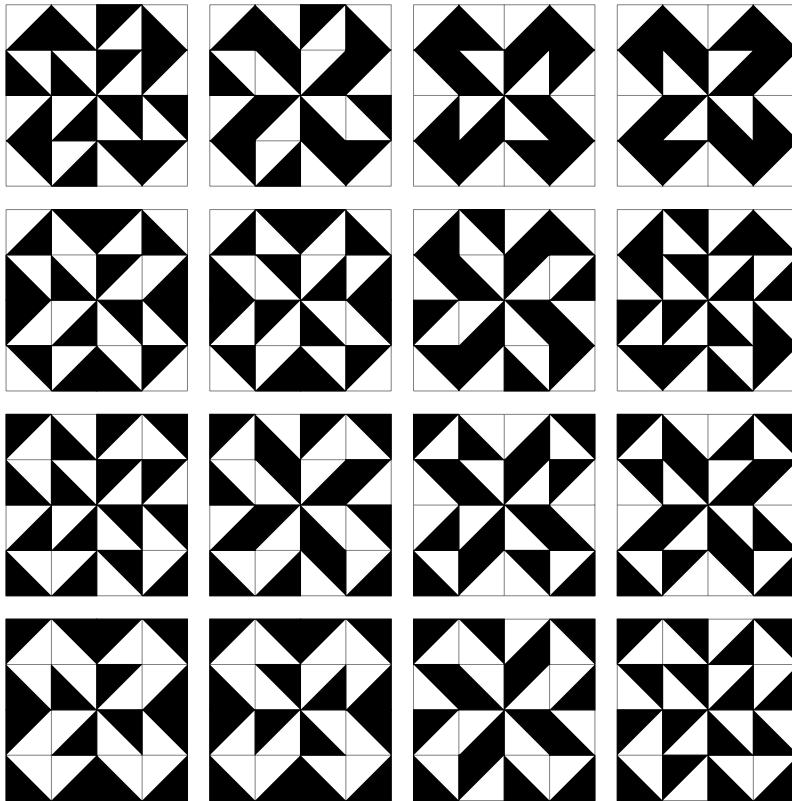
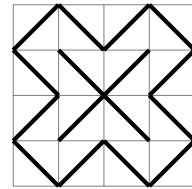


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0310 0312 0330 0332
2110 2112 2130 2132
2310 2312 2330 2332

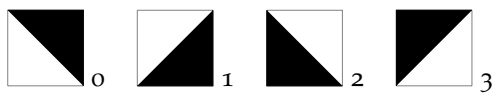


a	p	c	a
c	p	p	p
b	d	d	c
a	c	b	a

0111

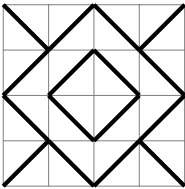
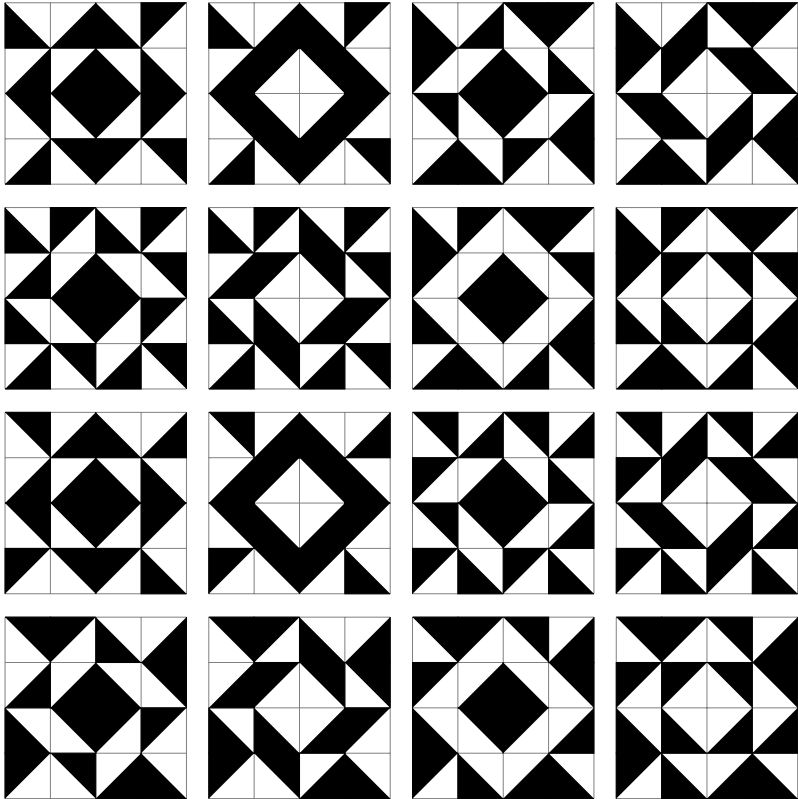


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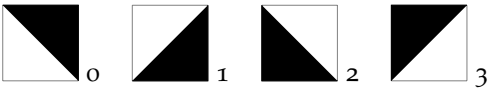


a	q	c	a
c	p	p	q
b	d	d	c
a	c	b	a

1000

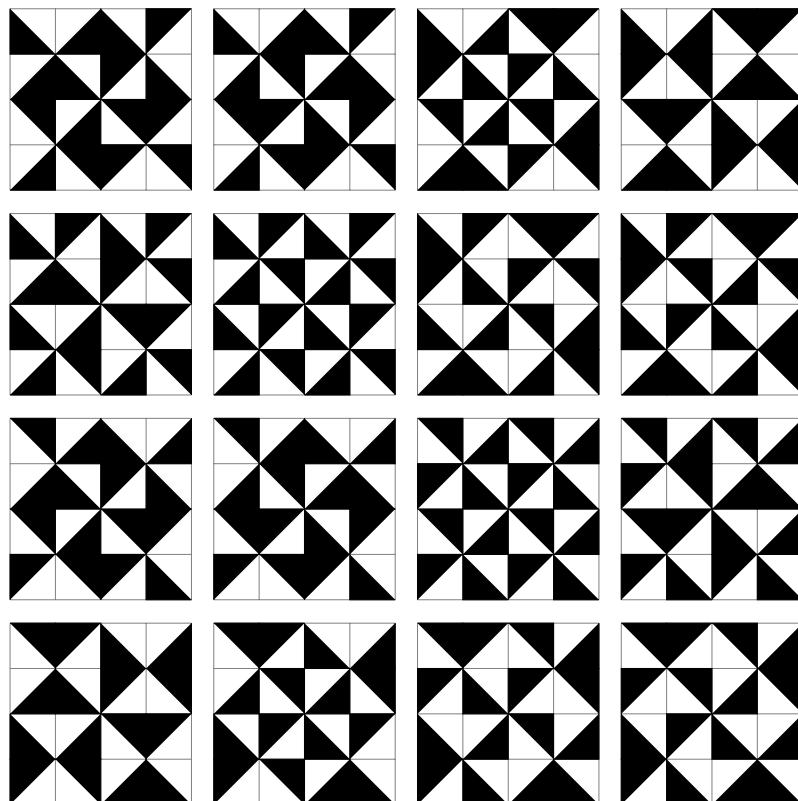
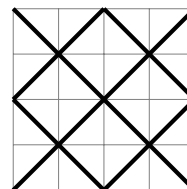


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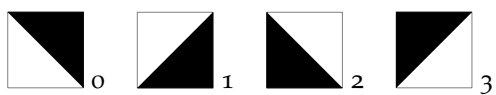


a	q	c	a
c	p	p	q
b	d	d	c
a	c	b	a

1001

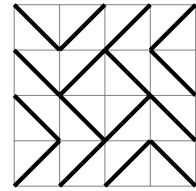
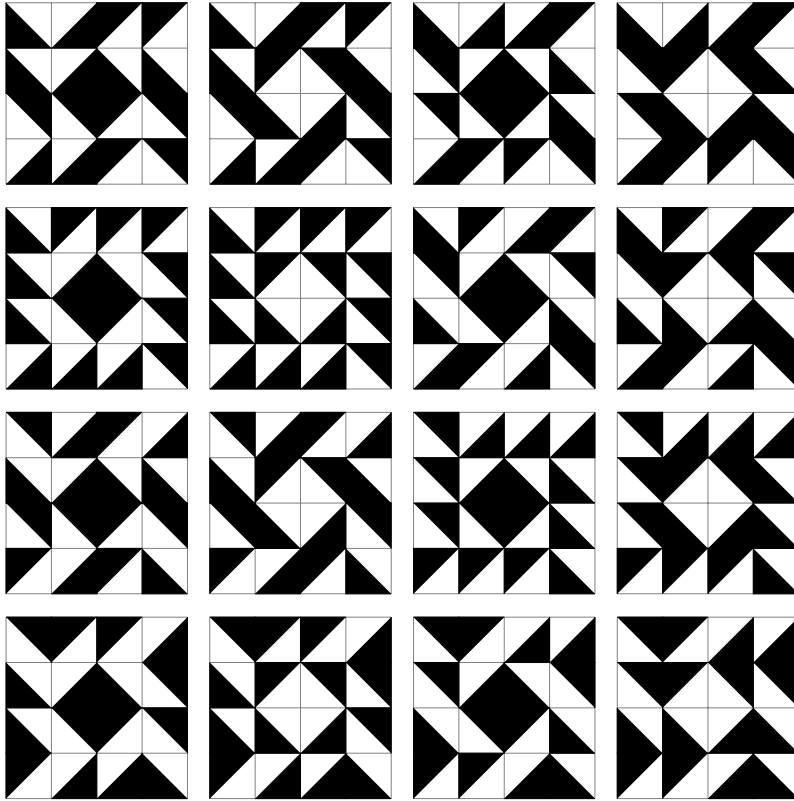


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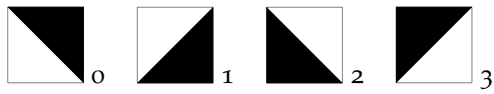


a	q	c	a
c	p	p	q
b	d	d	c
a	c	b	a

1010

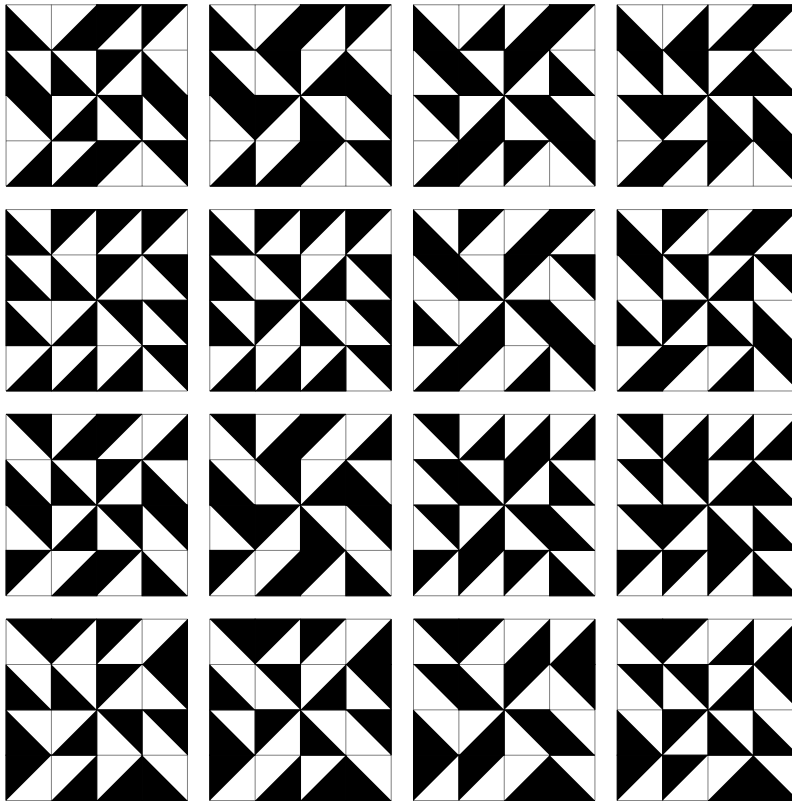
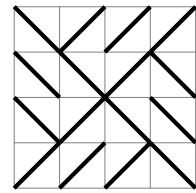


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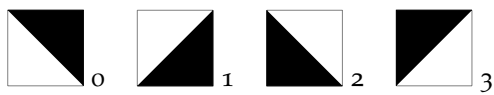


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c	p	p	q
b	d	d	c
a	c	b	a

1011

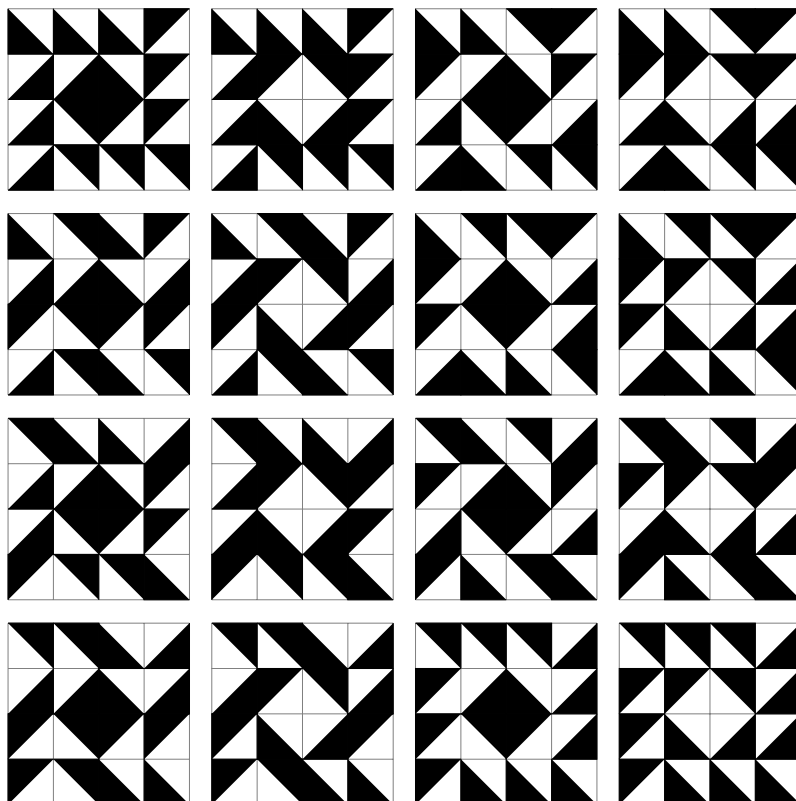
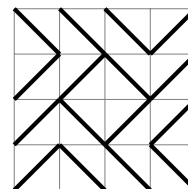


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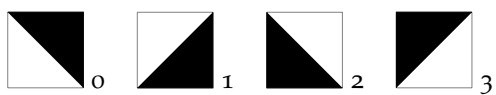


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c	p	p	q
b	d	d	c
a	c	b	a

1100

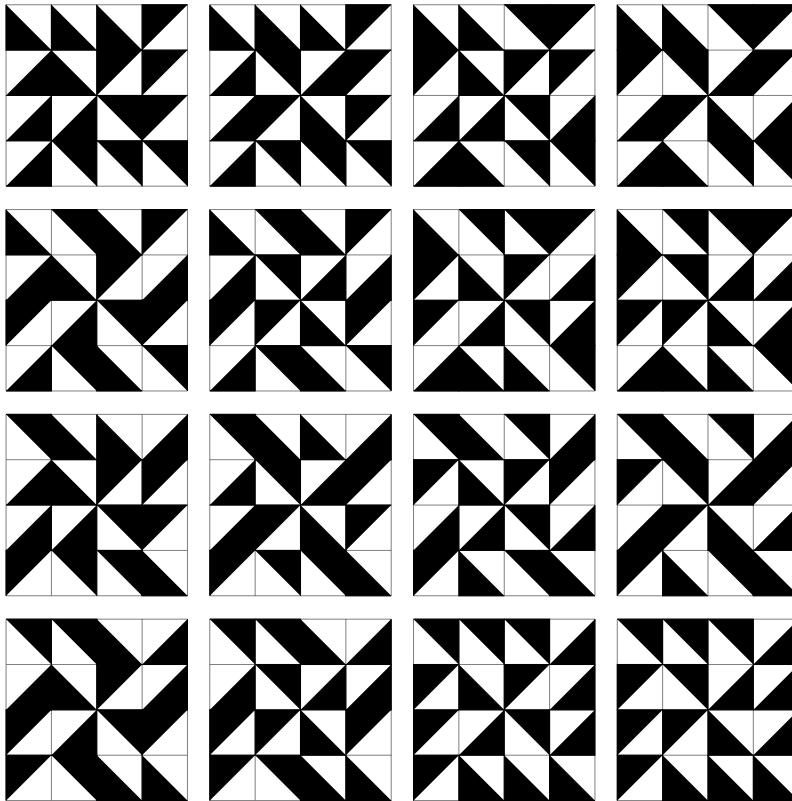
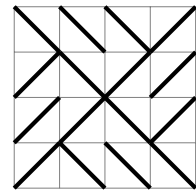


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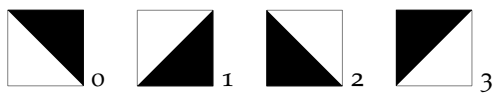


a	p	c	a
c	p	p	q
b	d	d	c
a	c	b	a

1101

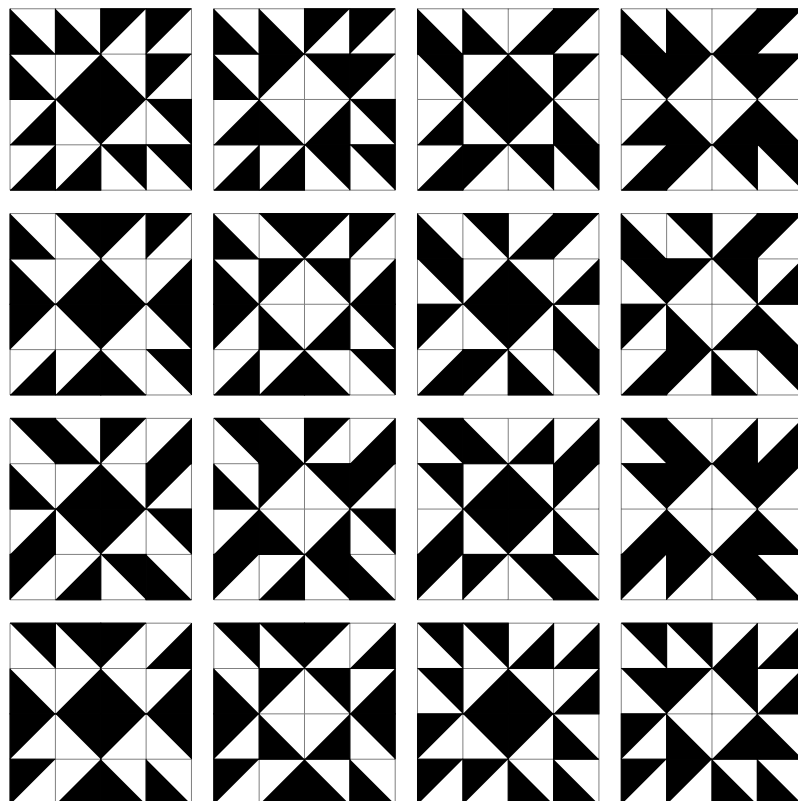
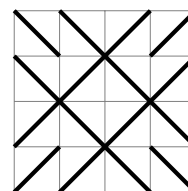


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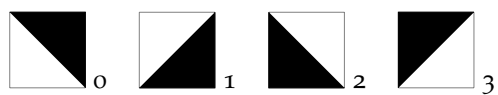


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c	p	p	q
b	d	d	c
a	c	b	a

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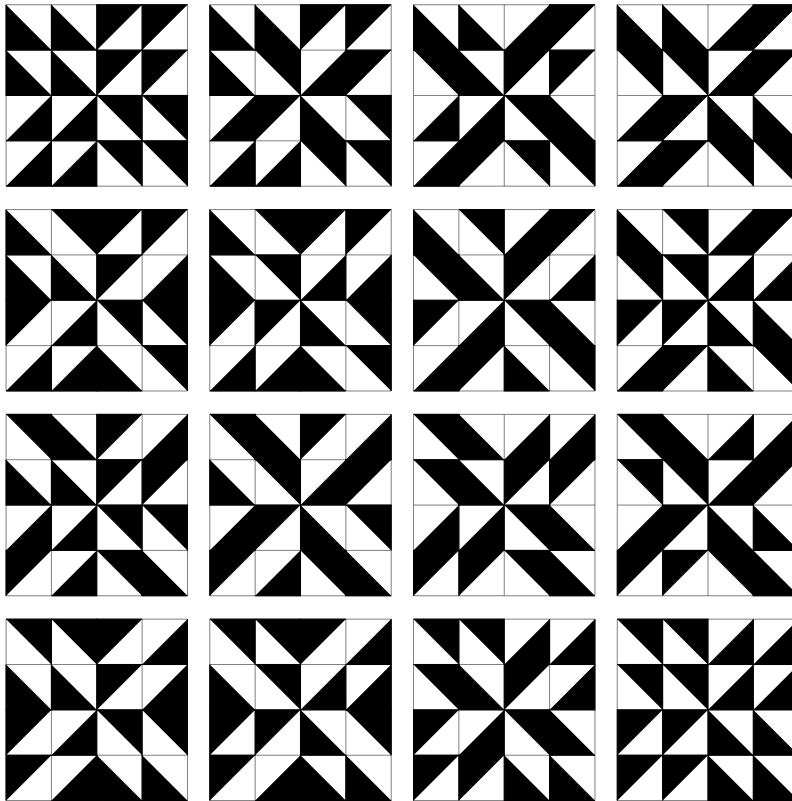
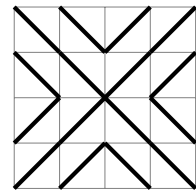


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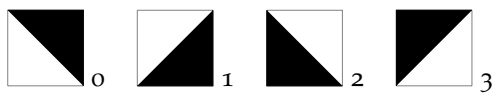


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c	p	p	q
b	d	d	c
a	c	b	a

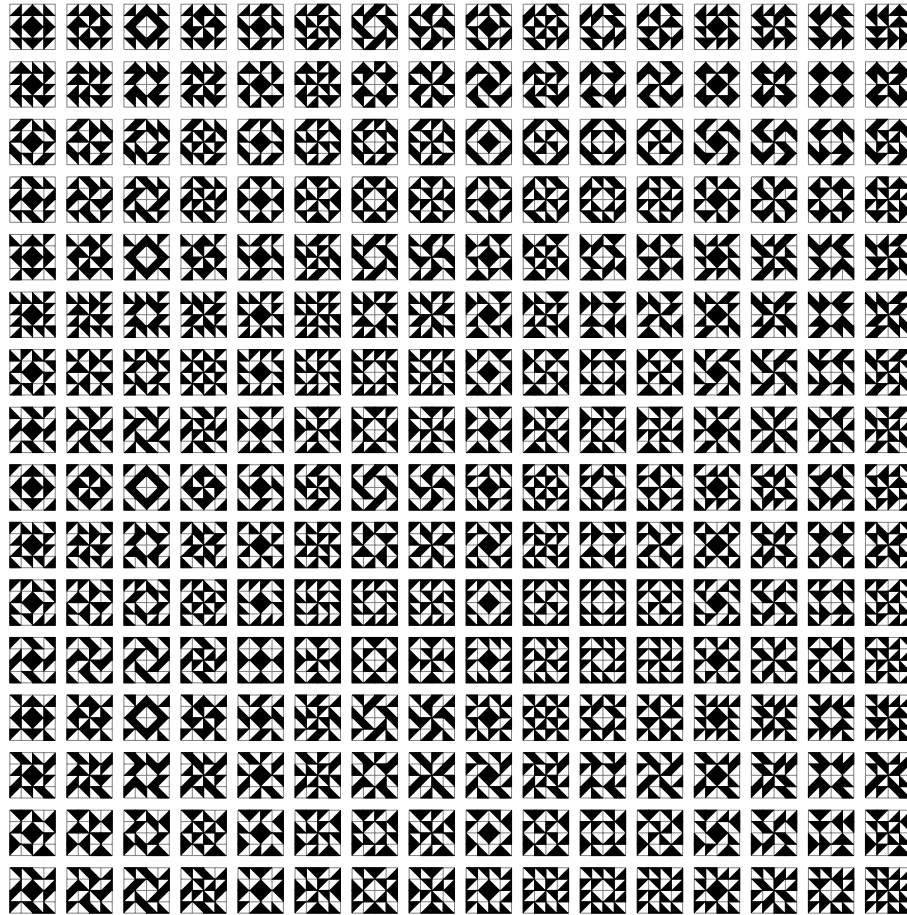
1111



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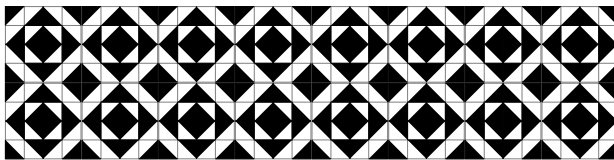
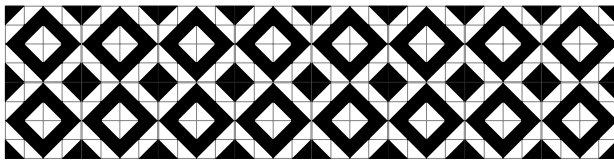
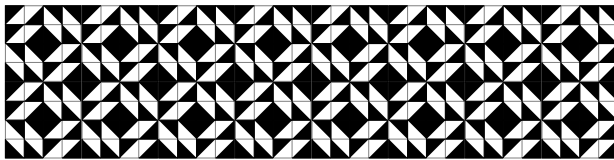
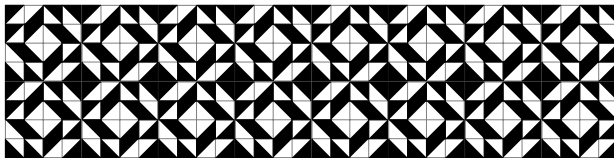
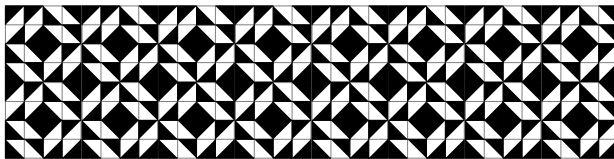
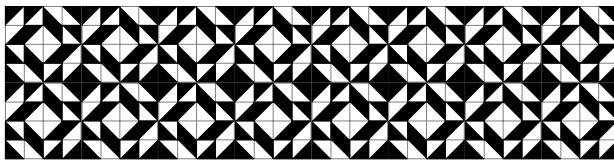
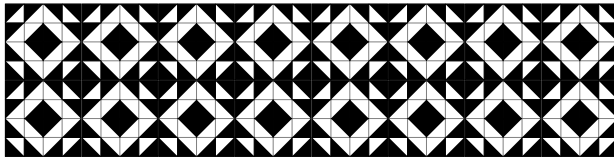
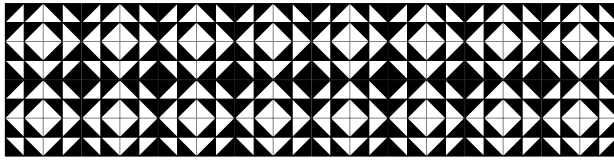


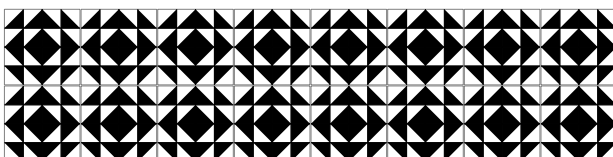
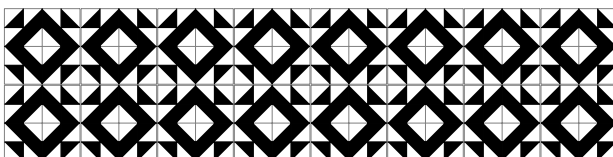
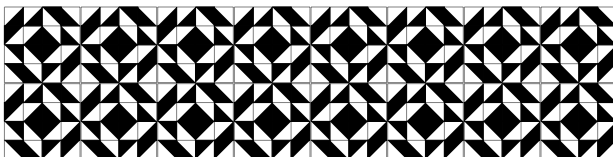
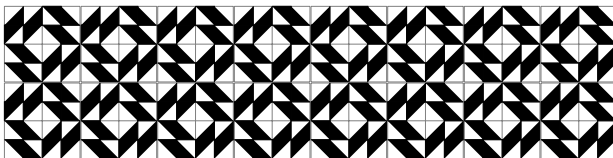
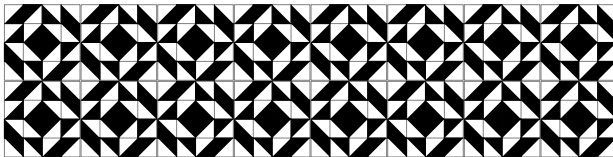
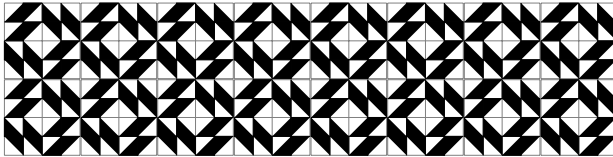
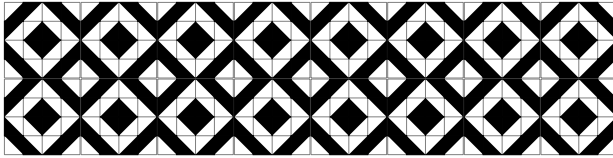
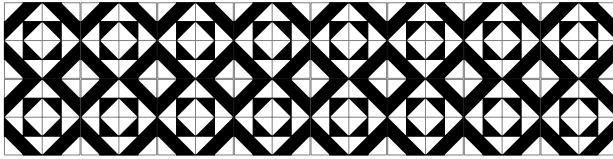
a	p	c	a
c	p	p	q
b	d	d	c
a	c	b	a

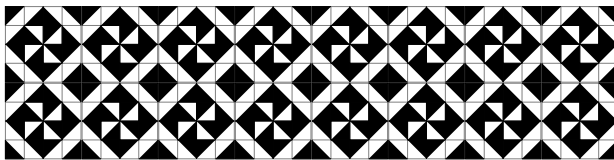
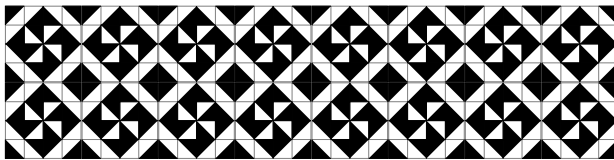
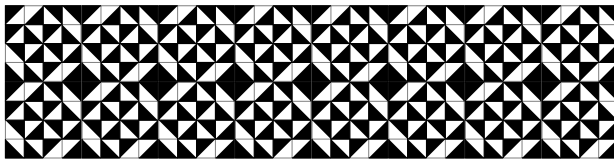
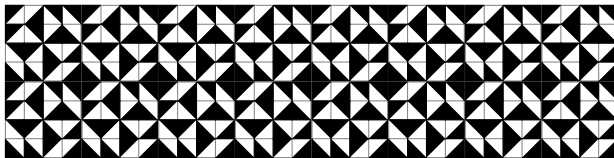
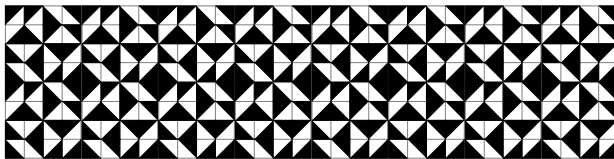
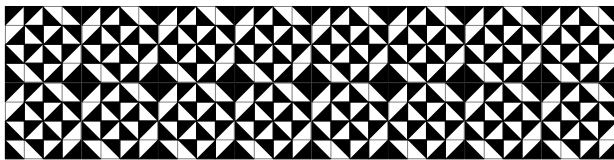
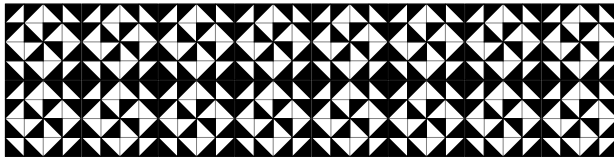
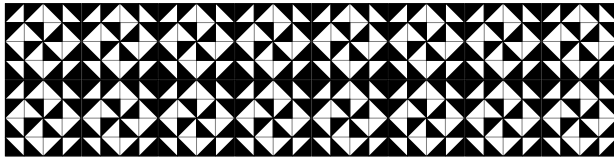


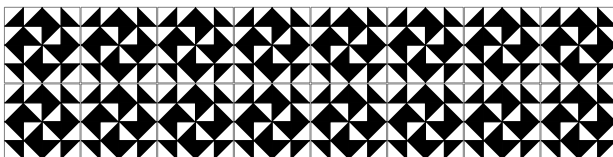
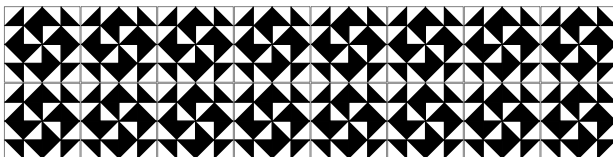
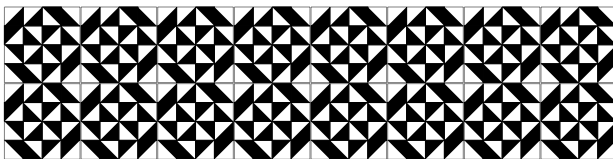
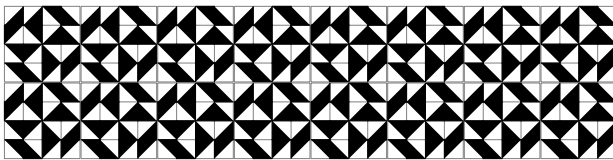
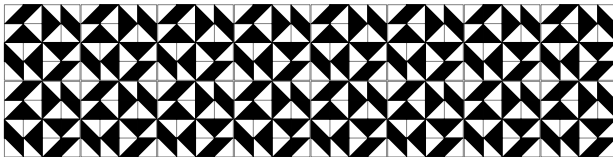
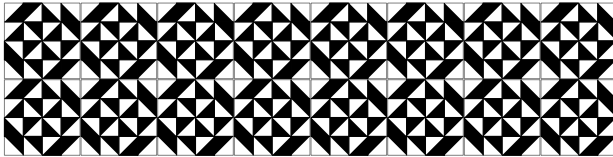
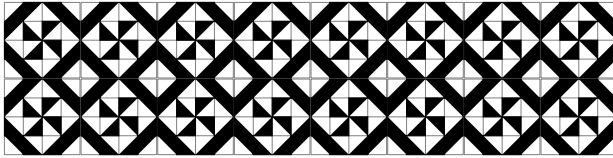
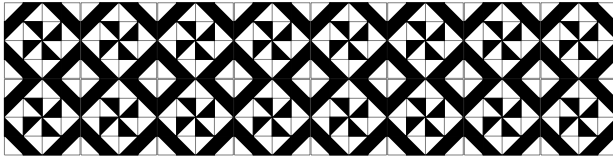
Friezes of Truchet patterns

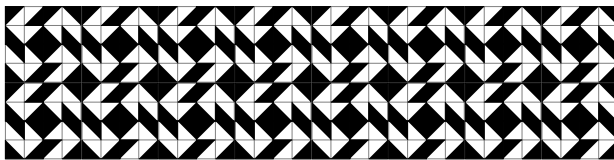
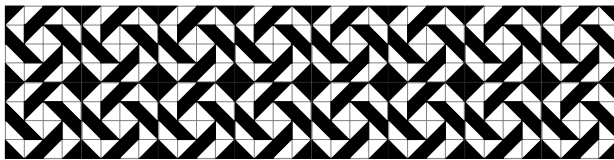
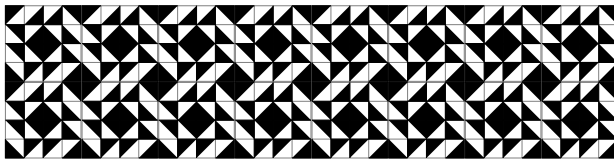
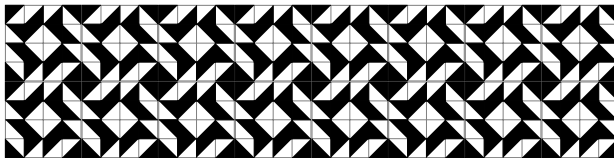
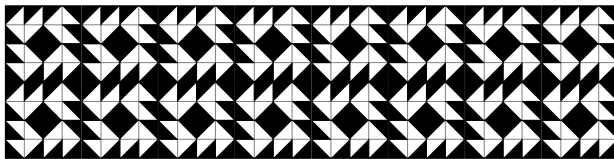
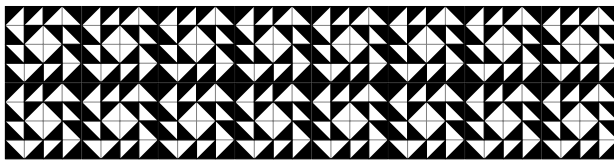
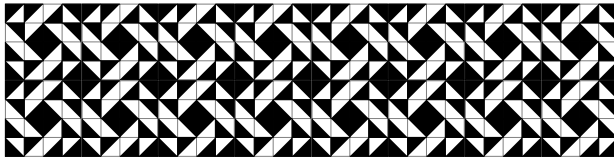
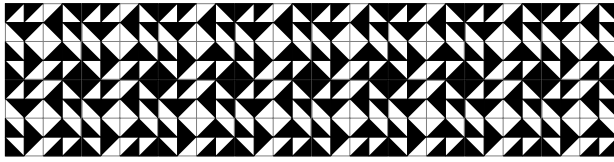
Each 4x4 Truchet pattern can be treated like a tile and used in a larger pattern. A *frieze* is a horizontal strip of tiles. Laying each of the 256 tiles in a frieze of the same tiles reveals other symmetrical patterns.

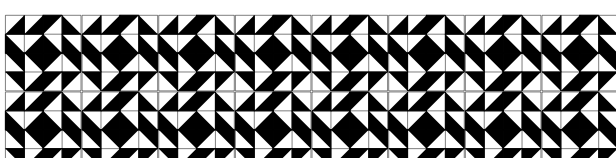
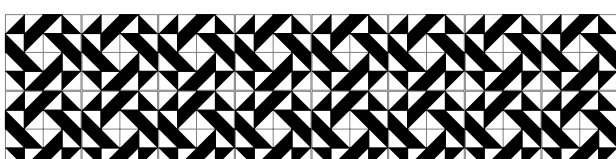
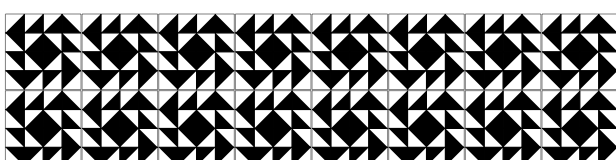
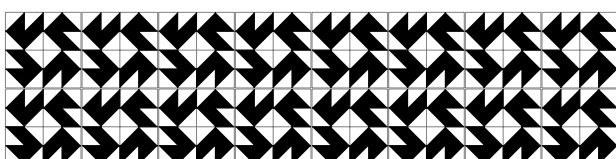
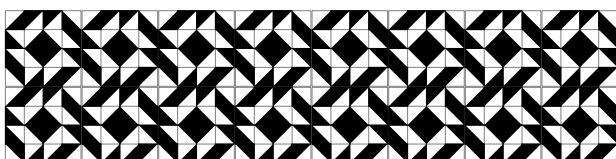
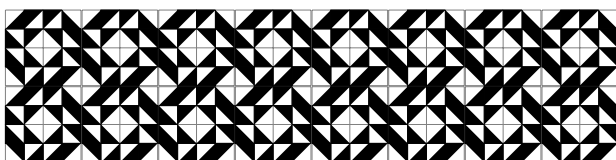
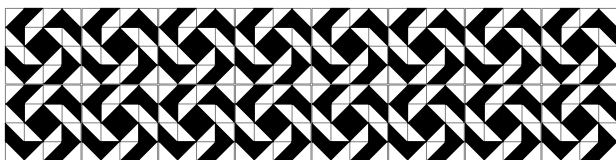
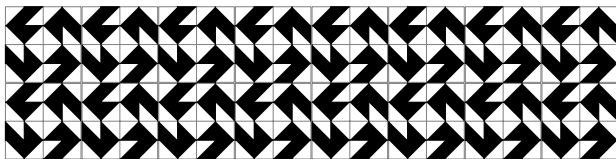
Frieze patterns for family 0000

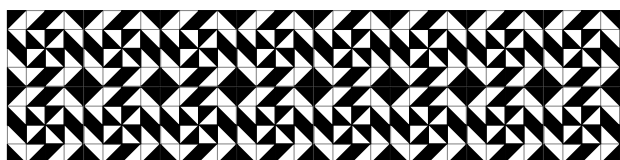
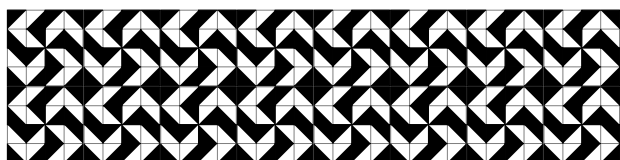
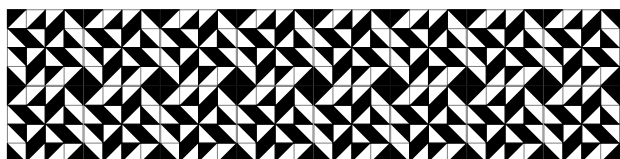
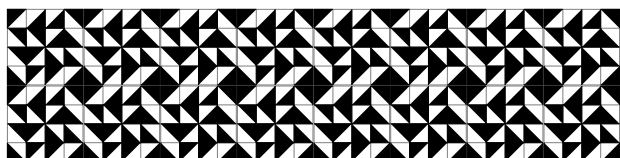
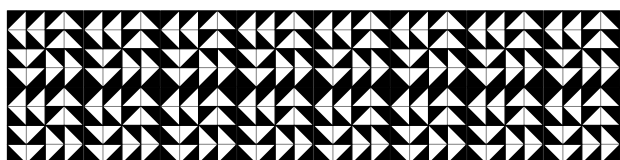
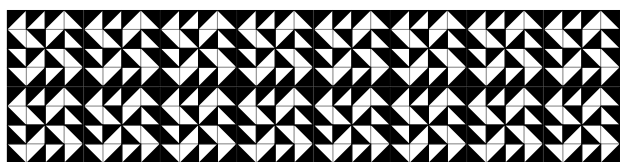
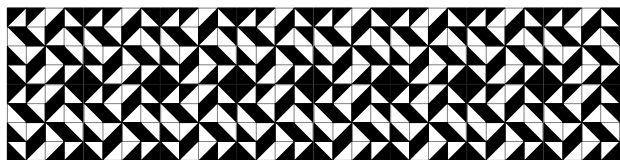
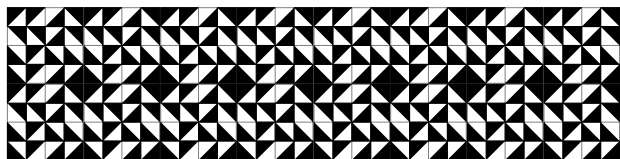


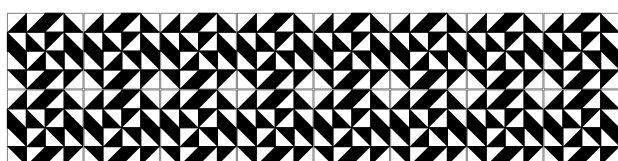
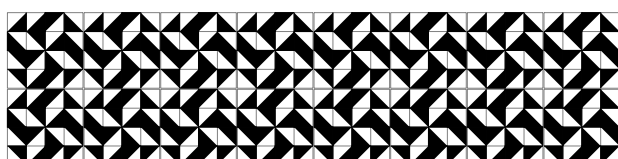
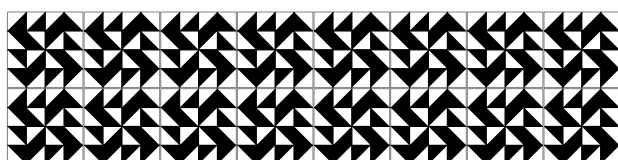
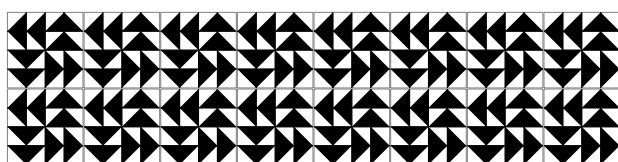
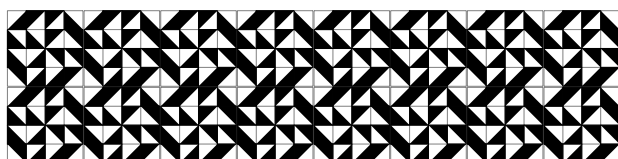
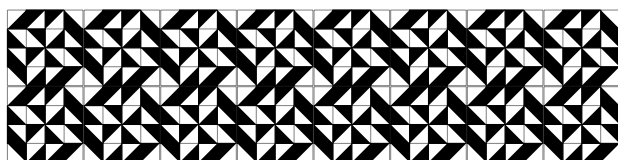
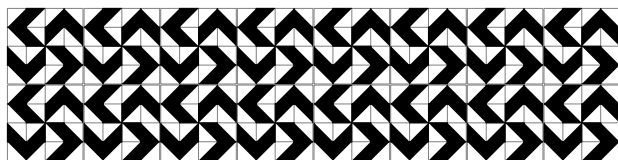
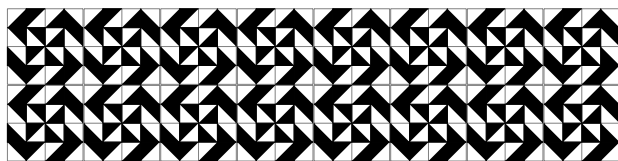
Frieze patterns for family 0001

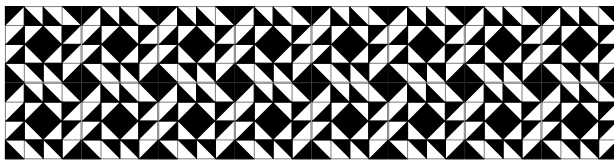
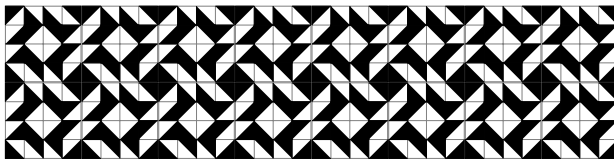
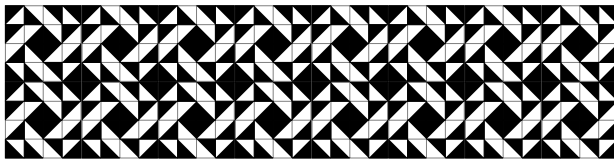
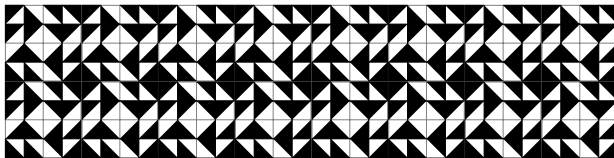
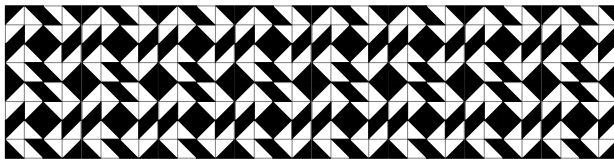
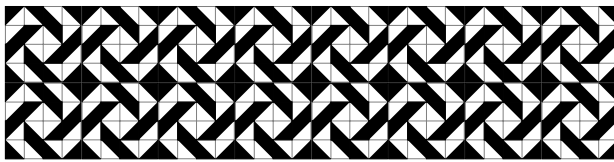
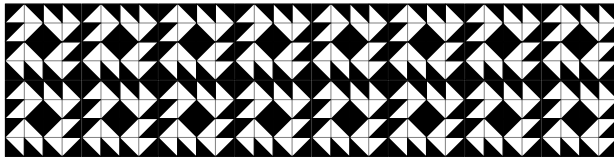
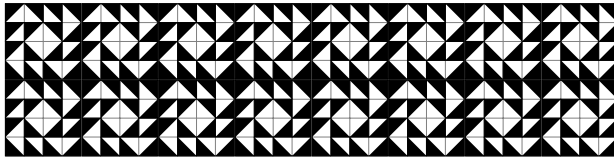


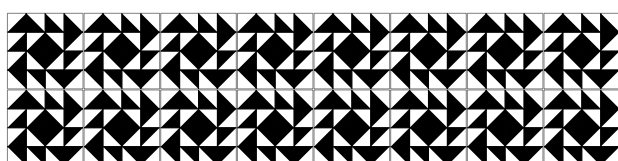
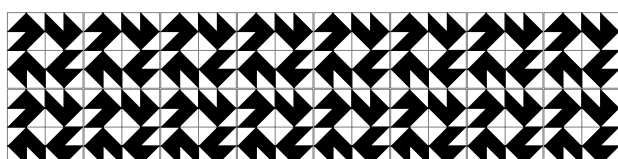
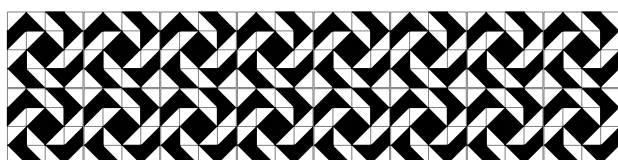
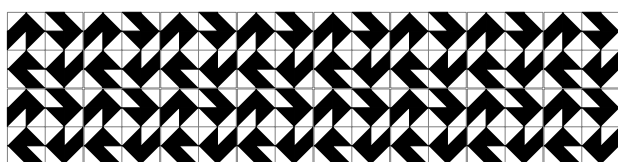
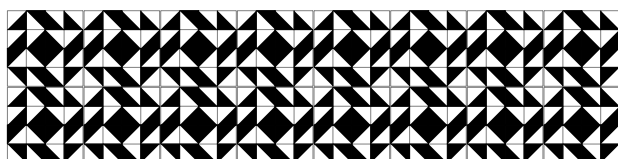
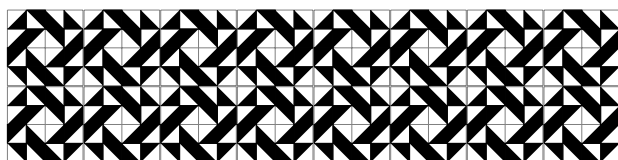
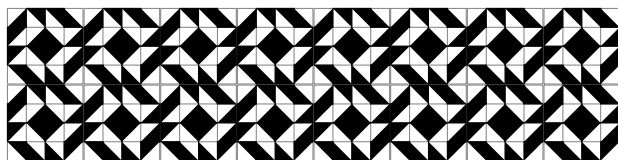
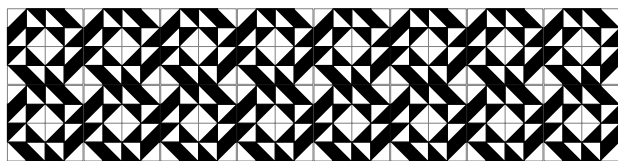
Frieze patterns for family 0010

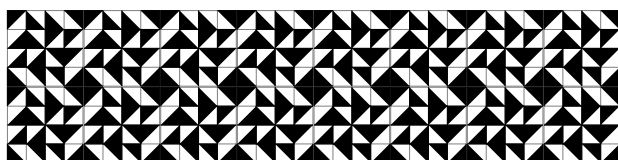
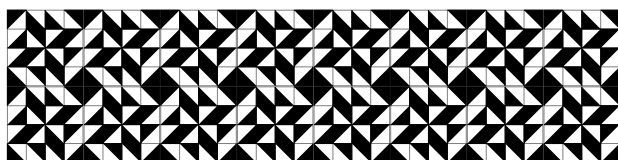
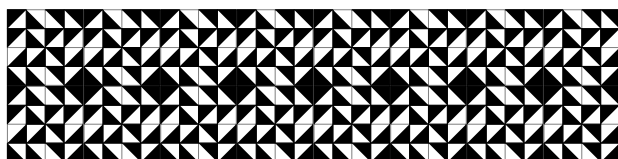
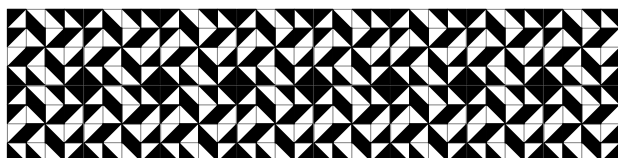
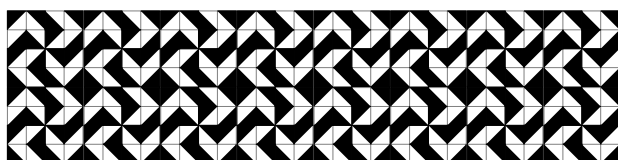
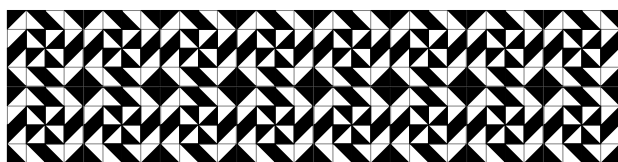
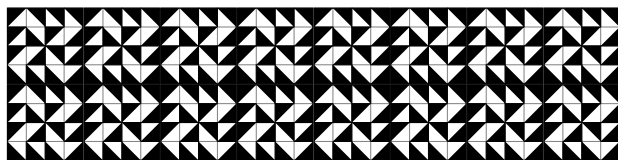
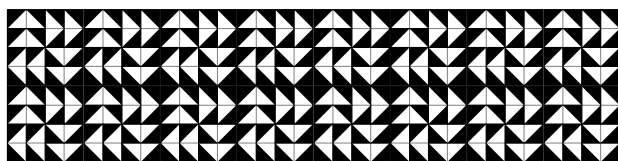


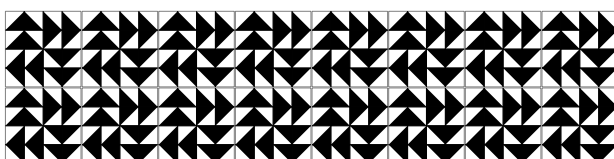
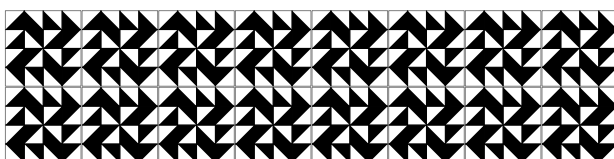
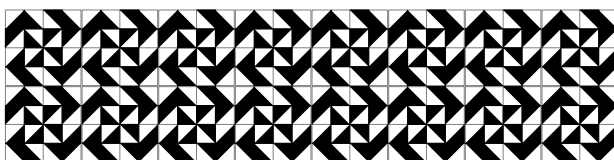
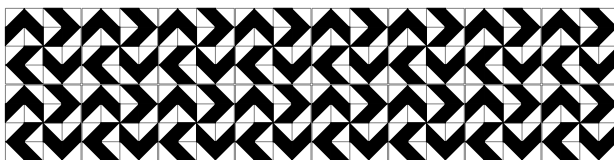
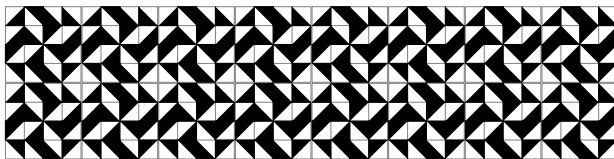
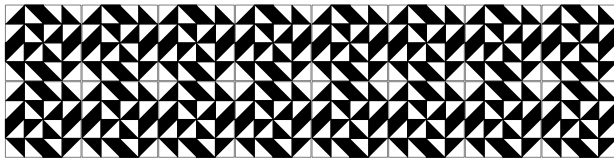
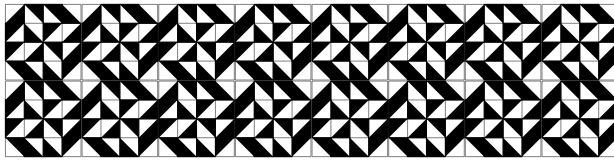
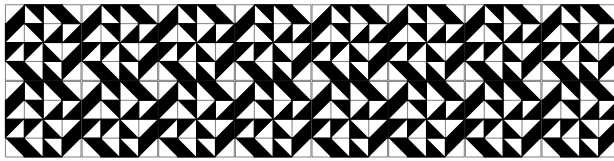
Frieze patterns for family 0011

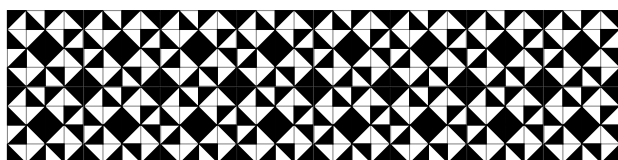
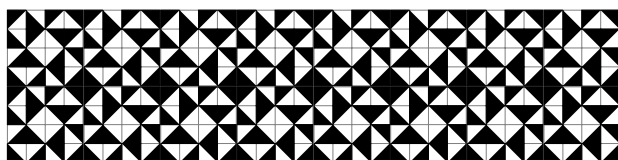
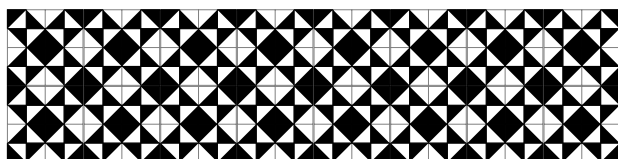
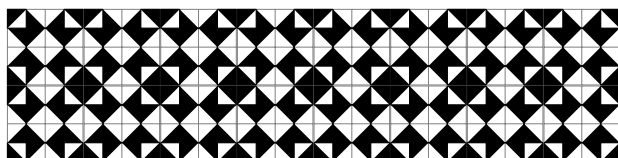
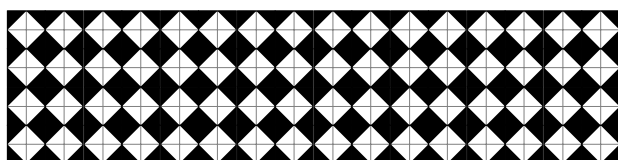
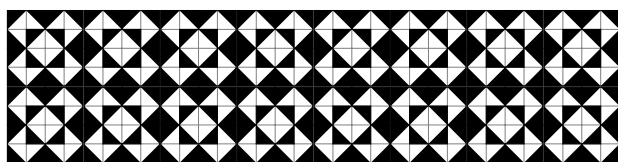
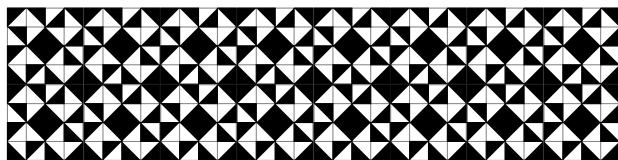
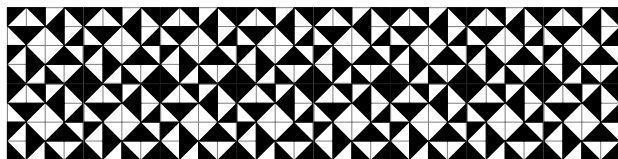


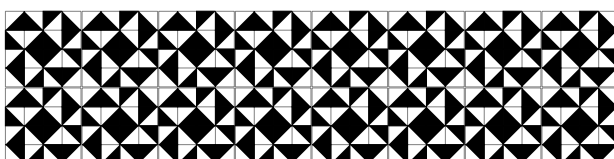
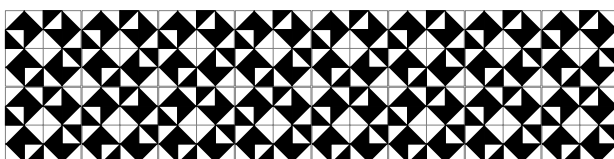
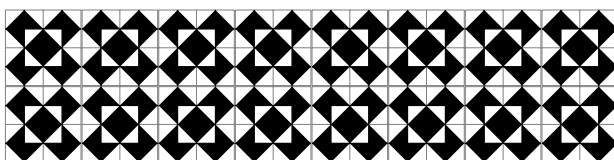
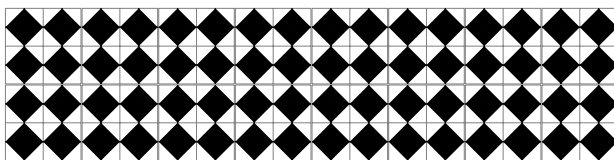
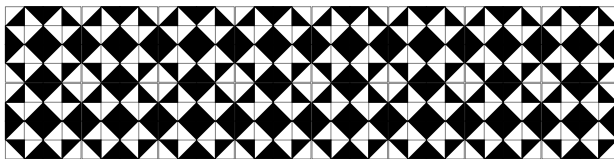
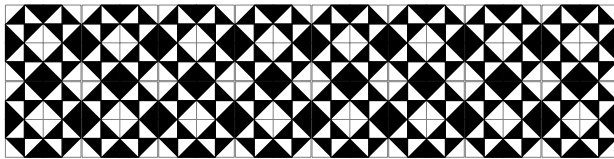
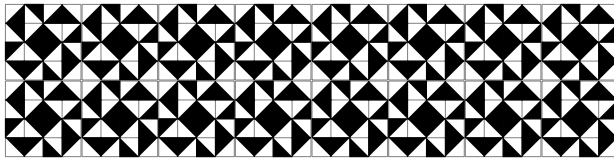
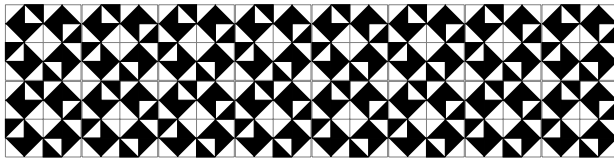
Frieze patterns for family 0100

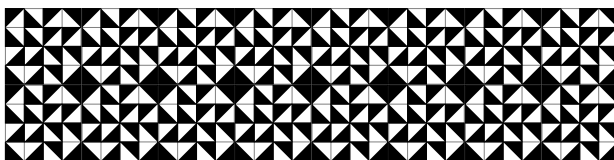
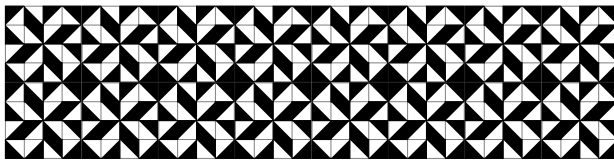
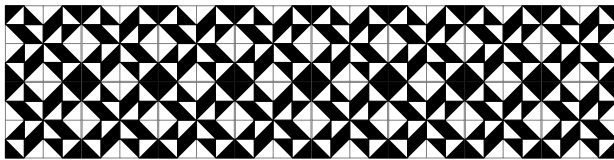
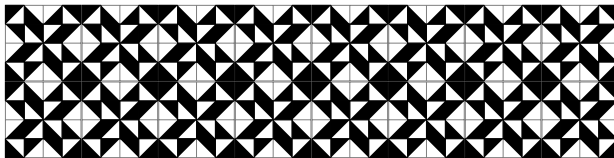
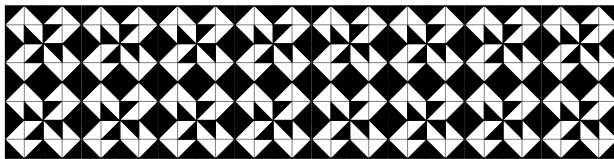
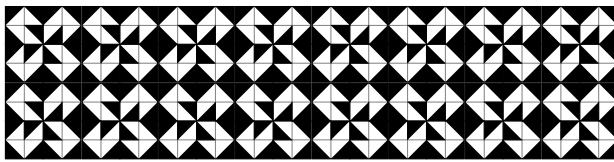
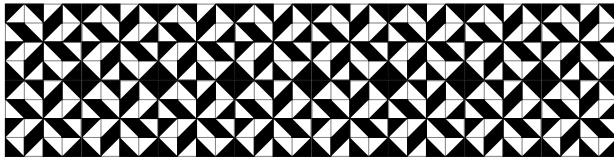
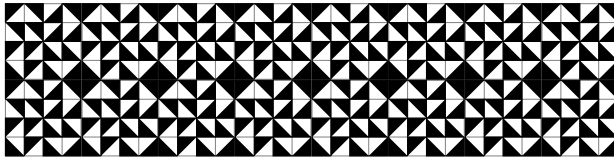


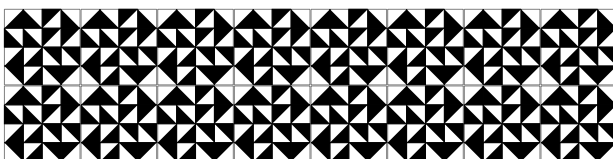
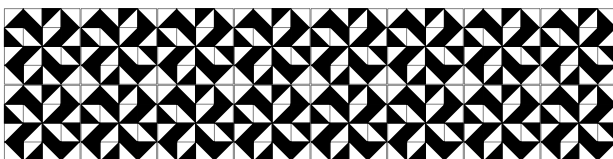
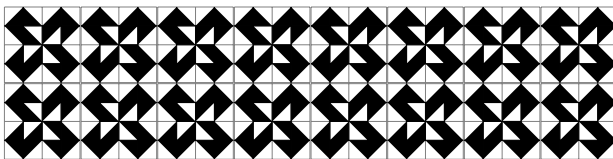
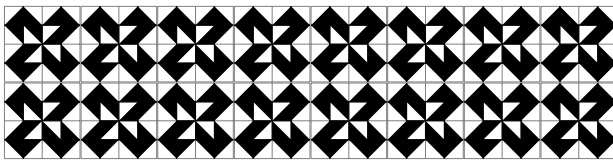
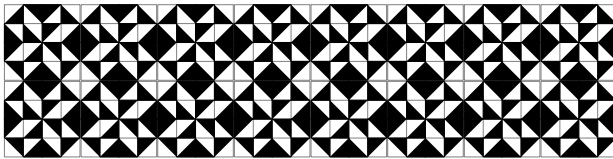
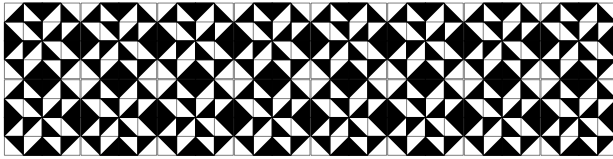
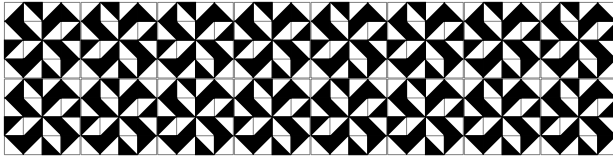
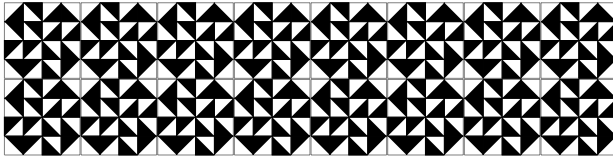
Frieze patterns for family 0101

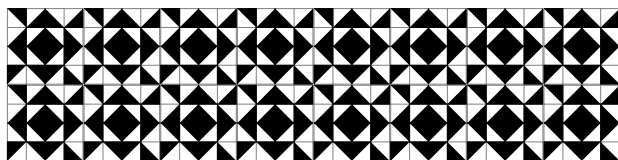
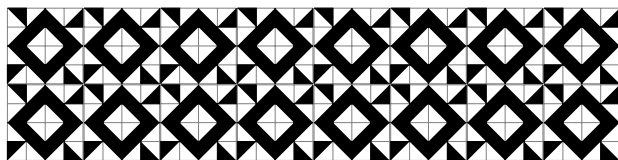
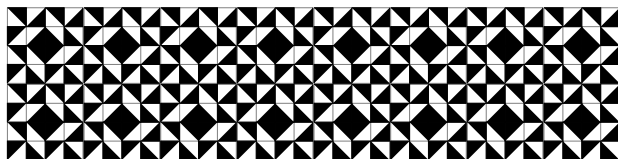
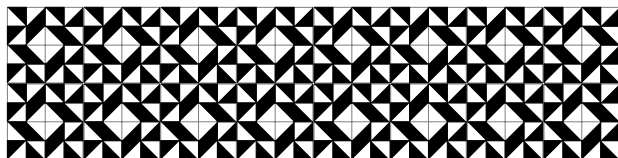
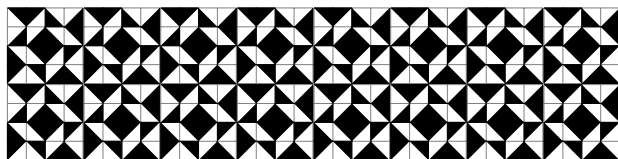
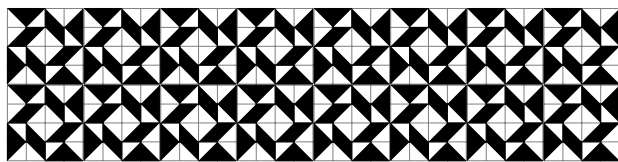
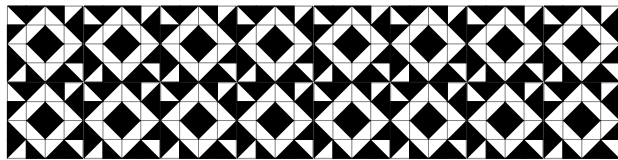
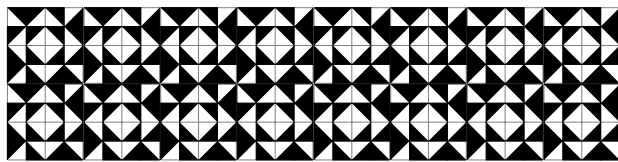


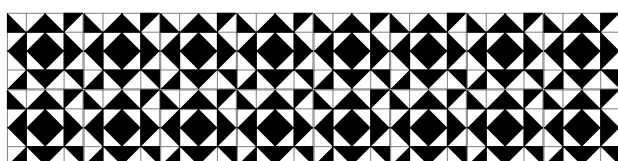
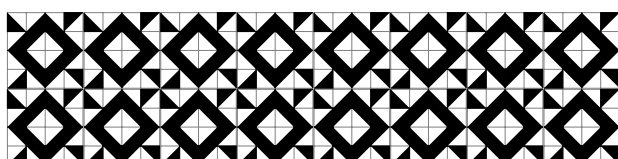
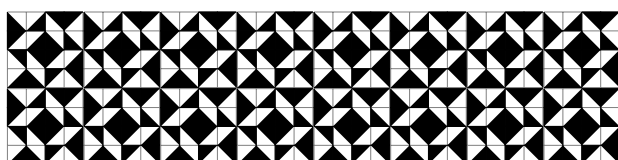
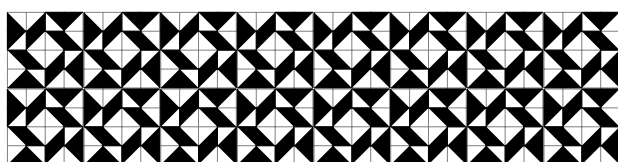
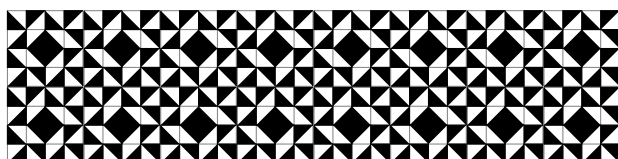
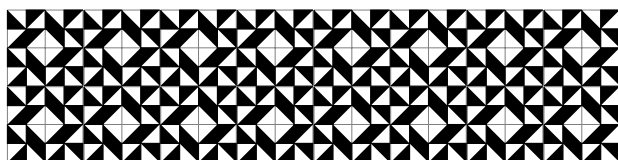
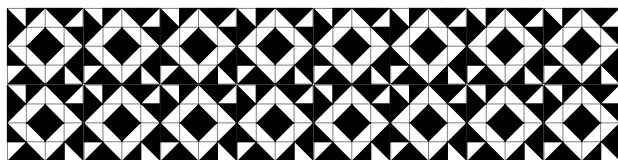
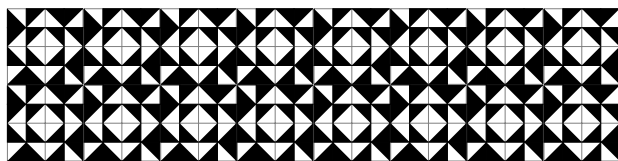
Frieze patterns for family 0110

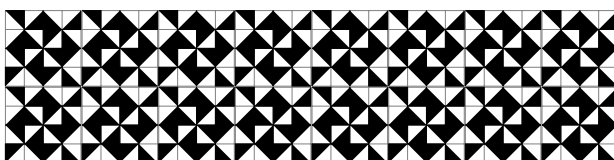
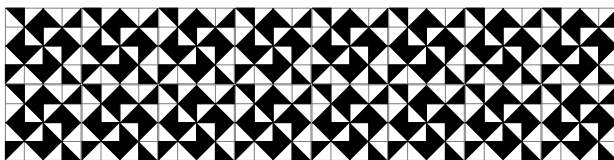
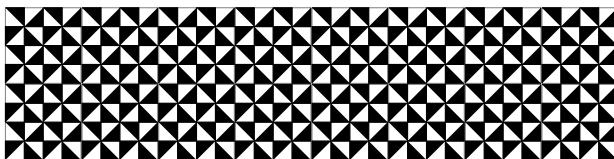
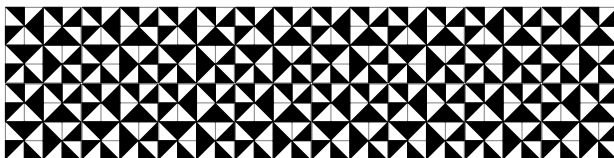
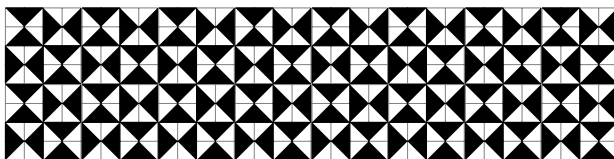
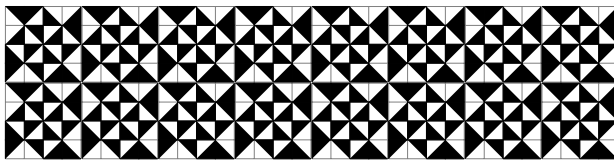
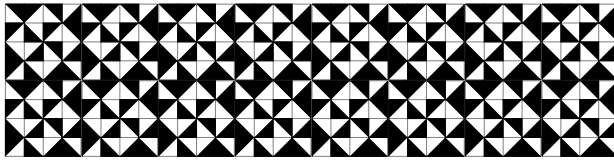
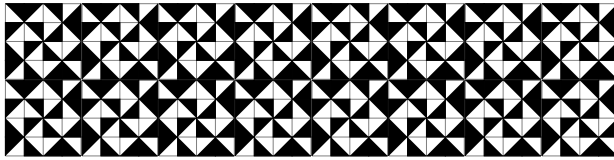


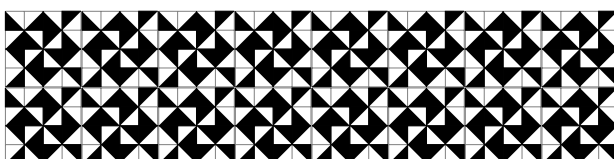
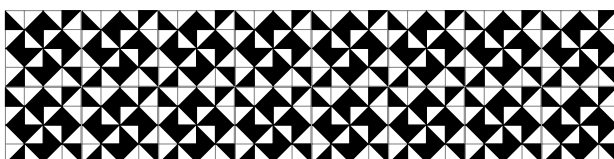
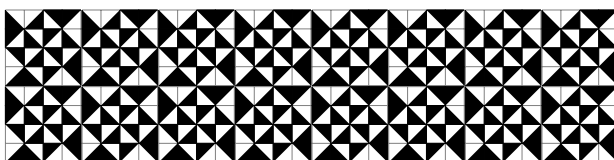
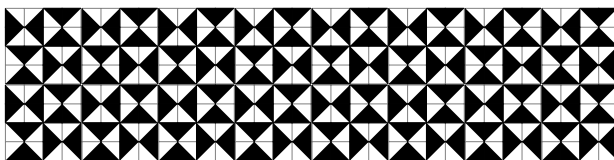
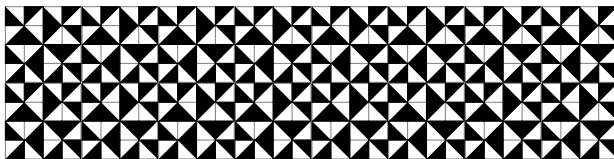
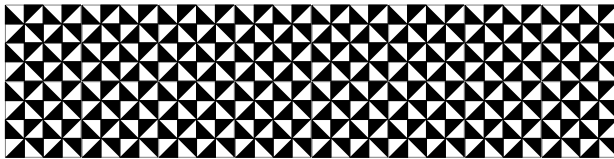
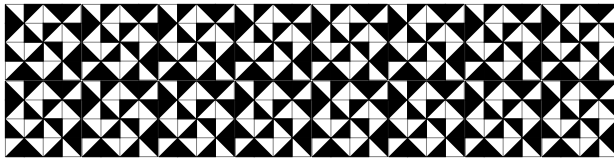
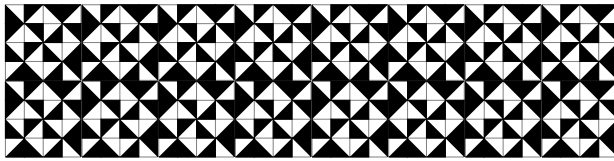
Frieze patterns for family 0111

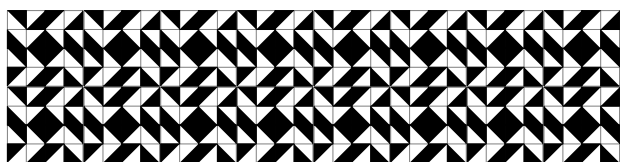
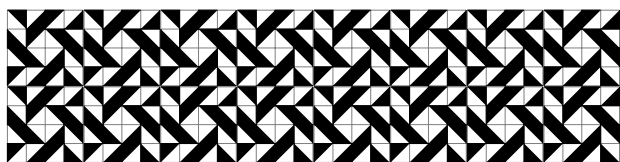
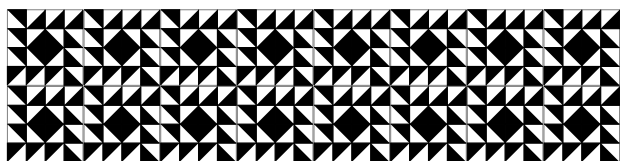
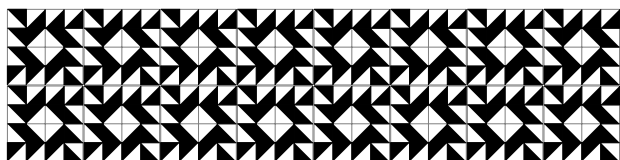
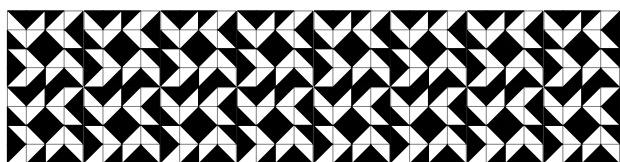
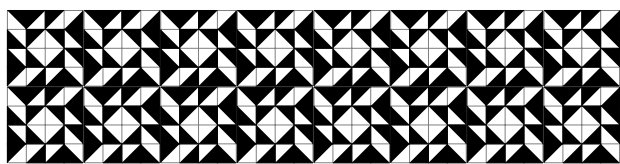
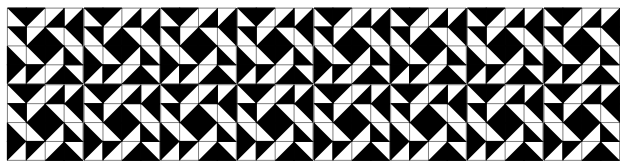
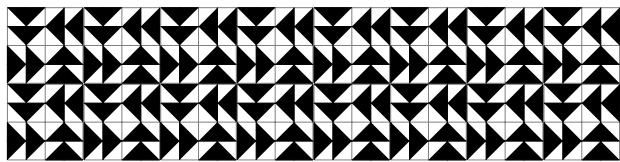


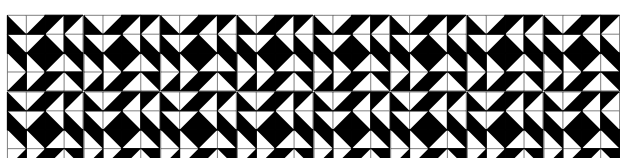
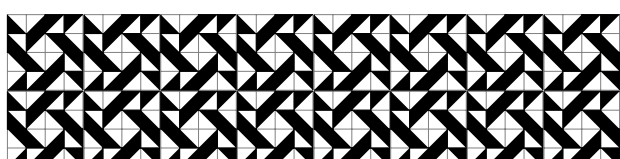
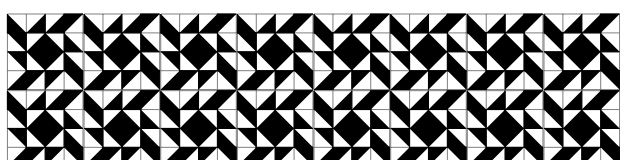
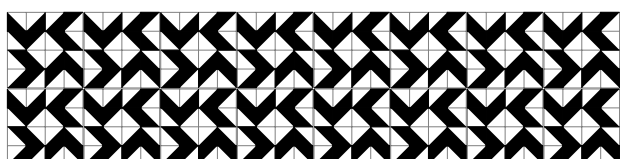
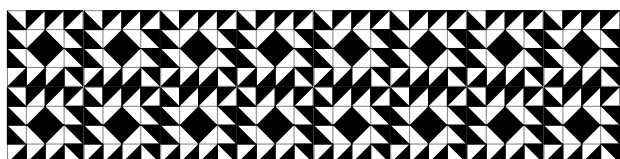
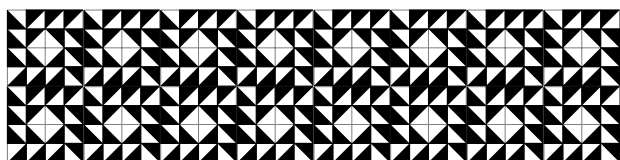
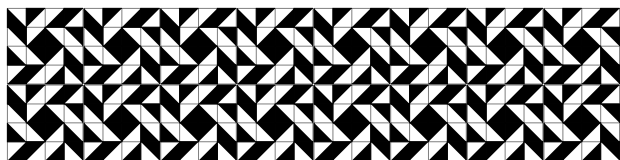
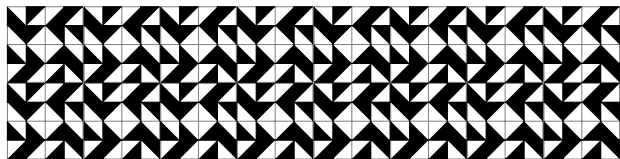
Frieze patterns for family 1000

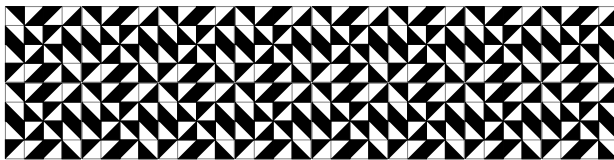
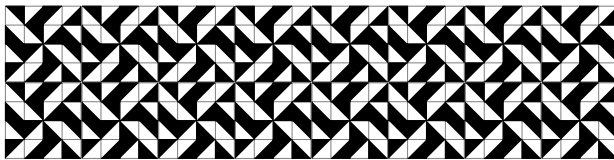
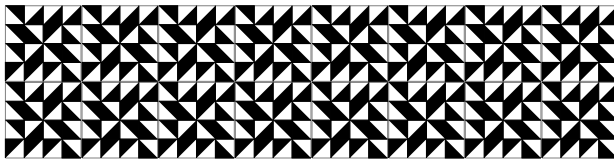
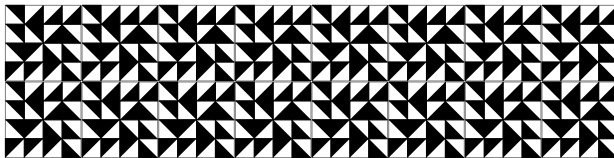
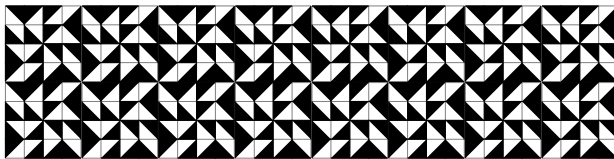
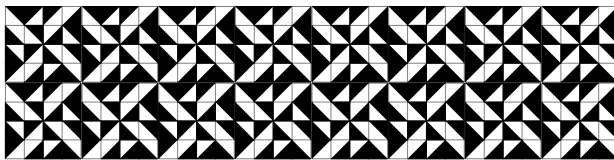
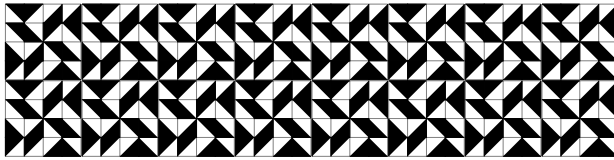
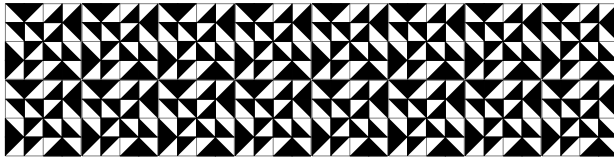


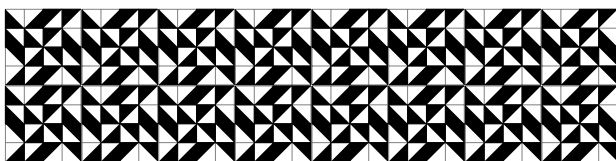
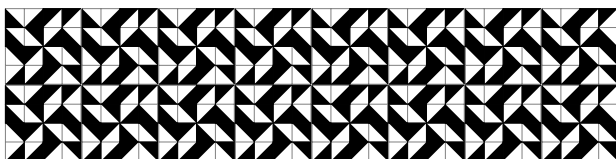
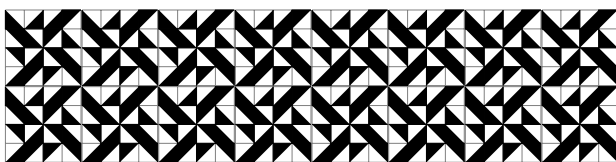
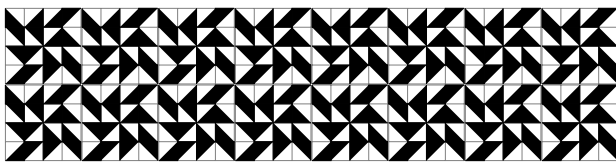
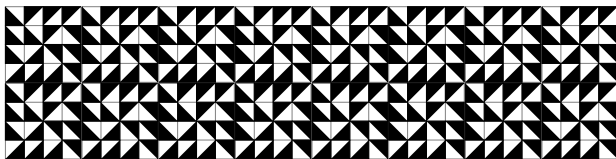
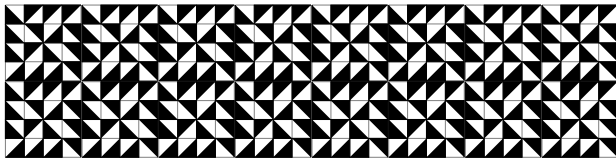
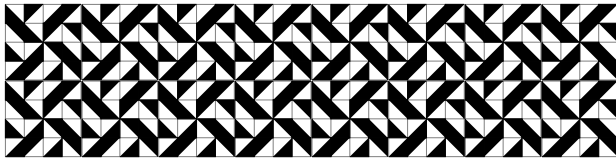
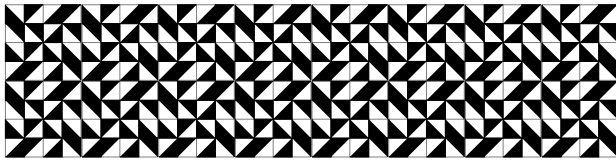
Frieze patterns for family 1001

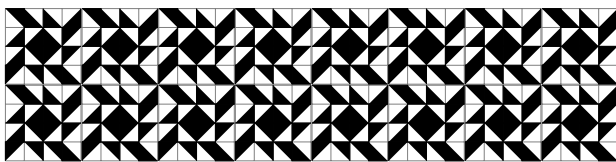
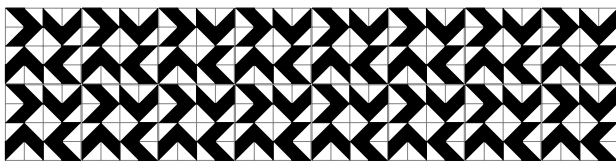
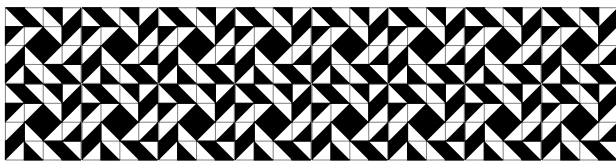
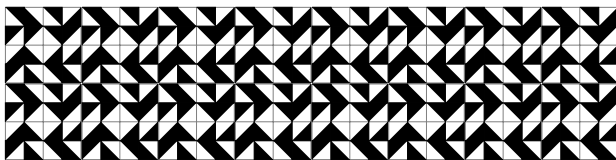
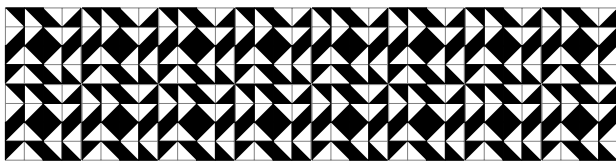
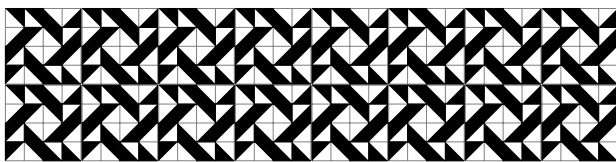
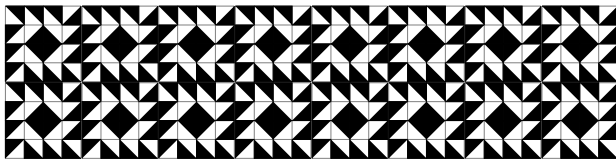
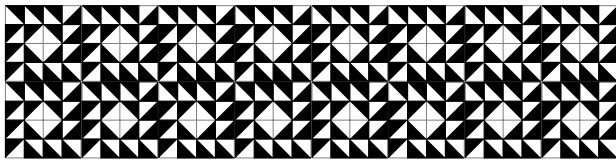


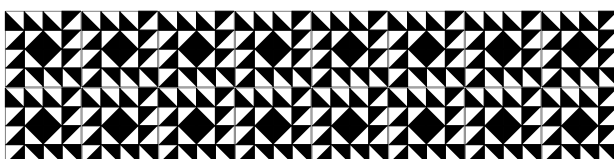
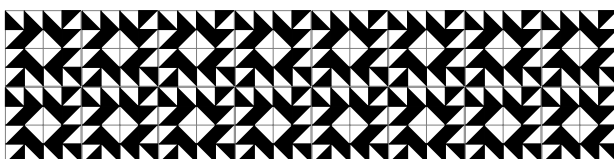
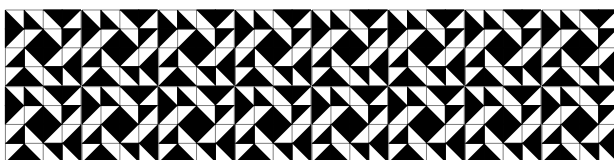
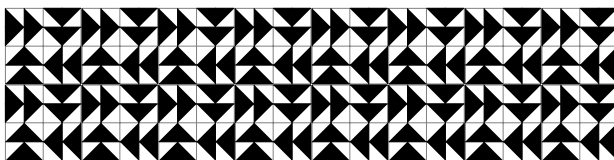
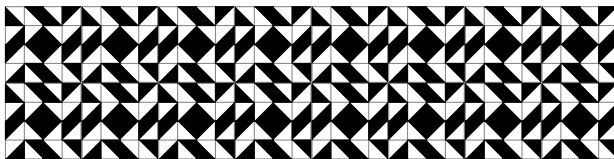
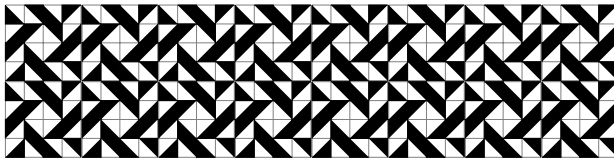
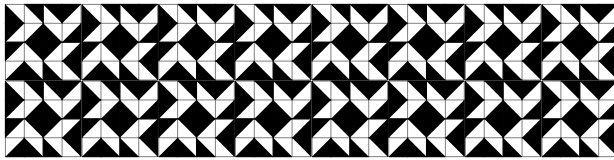
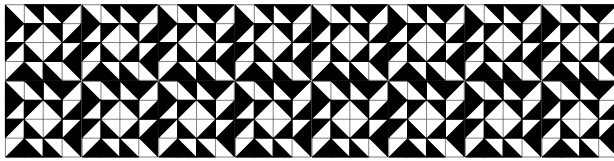
Frieze patterns for family 1010

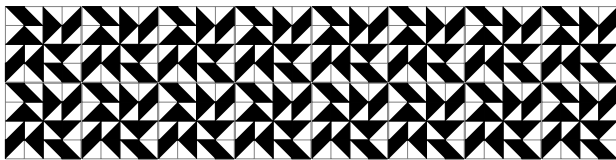
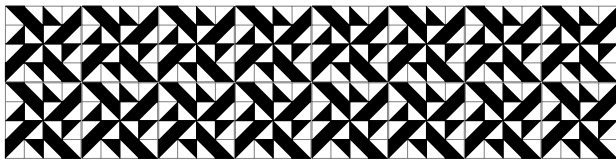
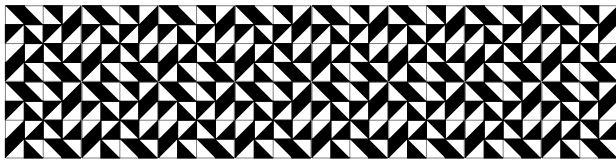
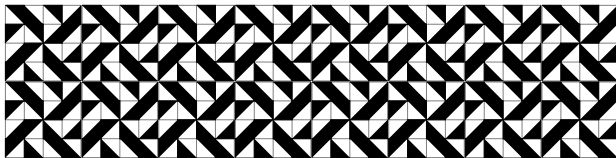
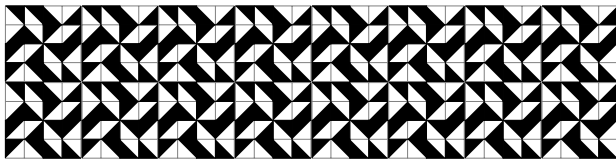
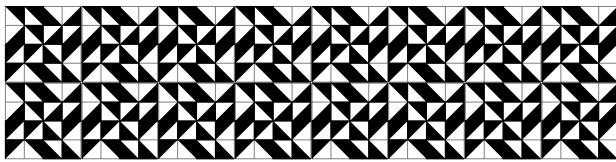
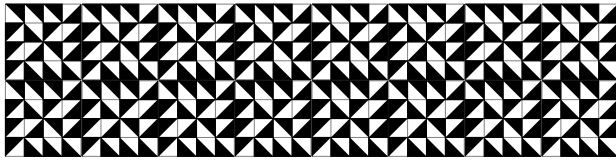
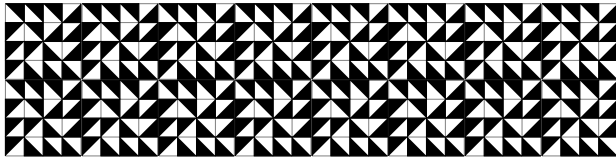


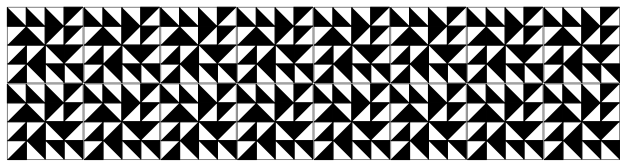
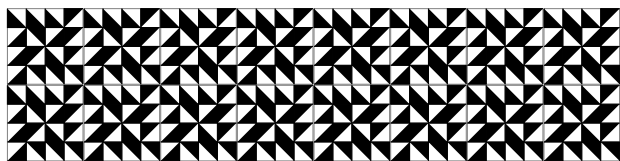
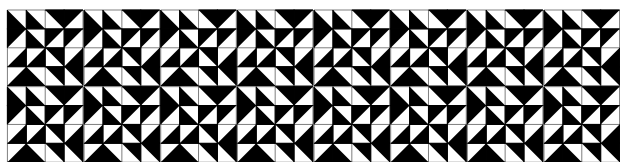
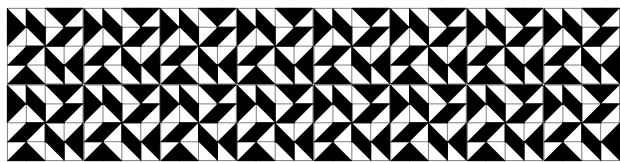
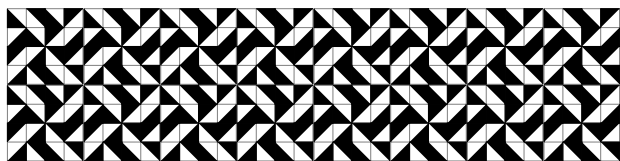
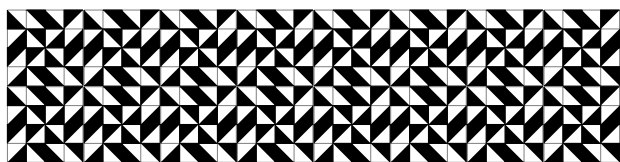
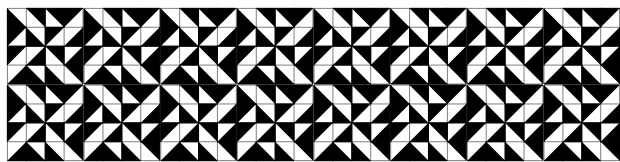
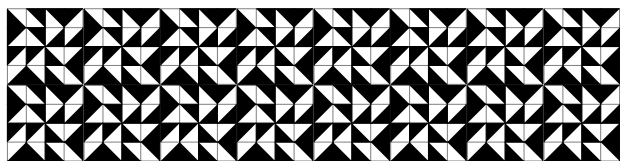
Frieze patterns for family 1011

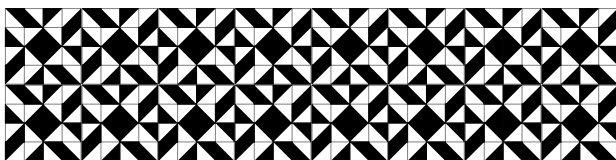
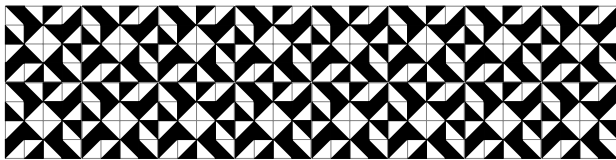
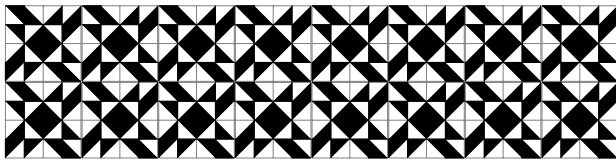
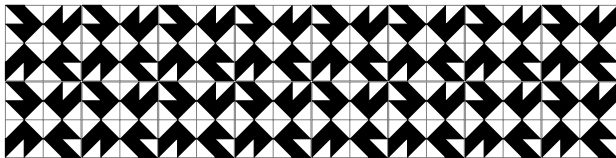
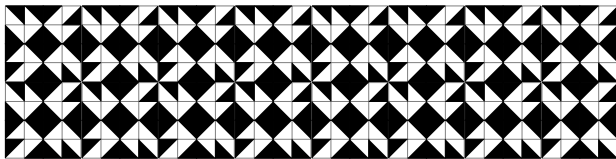
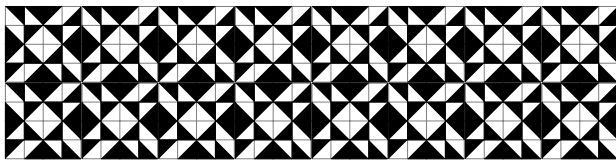
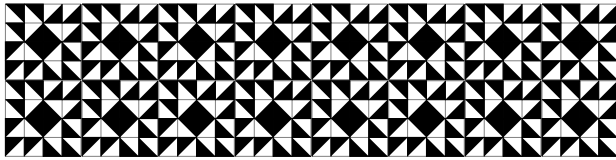
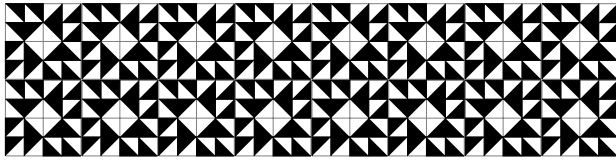


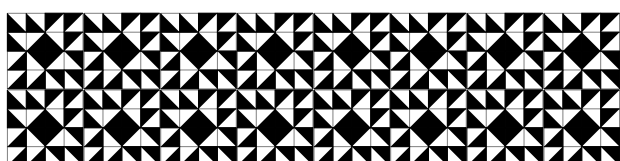
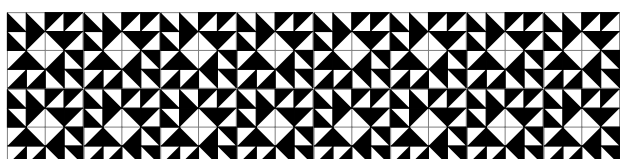
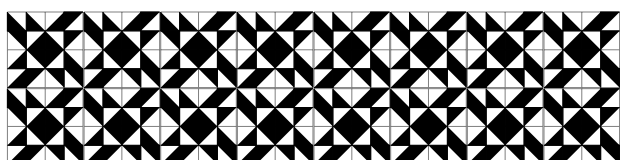
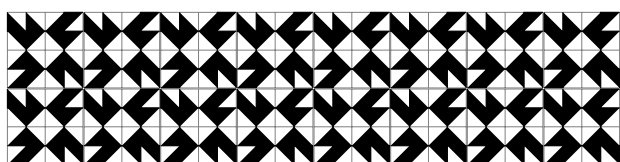
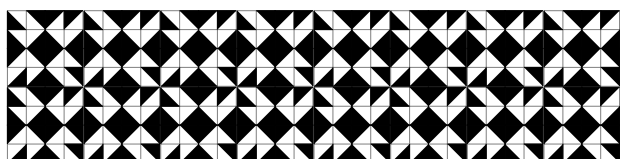
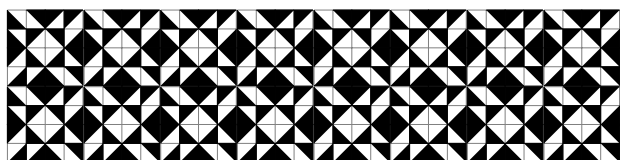
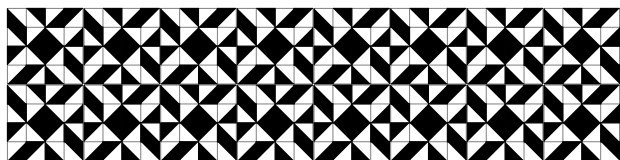
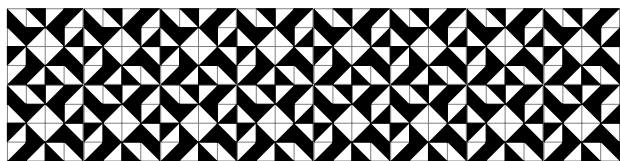
Frieze patterns for family 1100

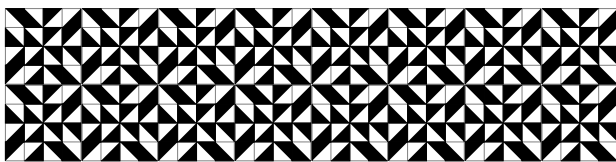
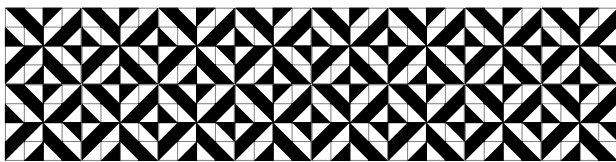
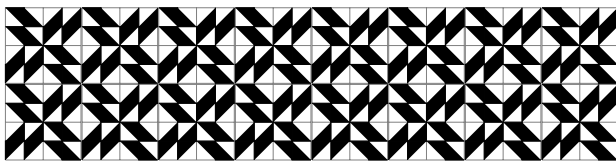
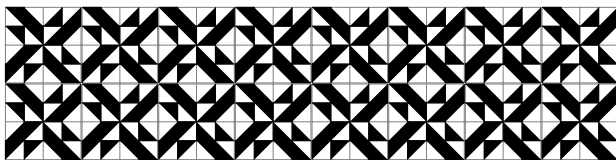
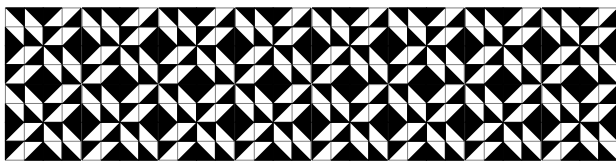
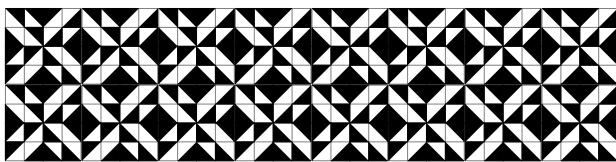
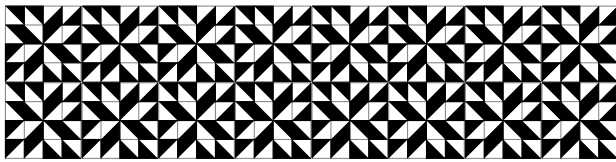
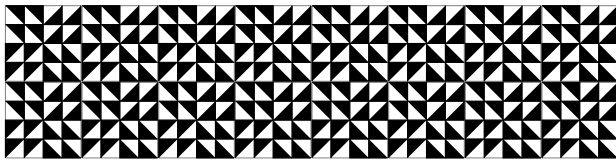


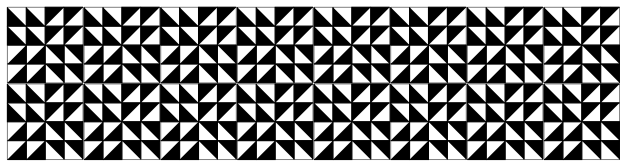
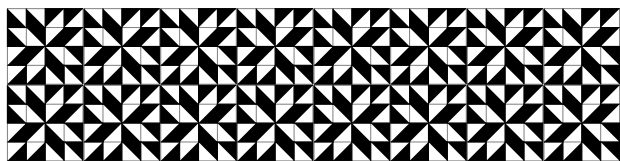
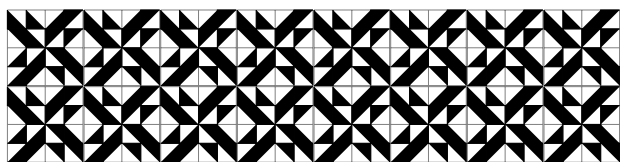
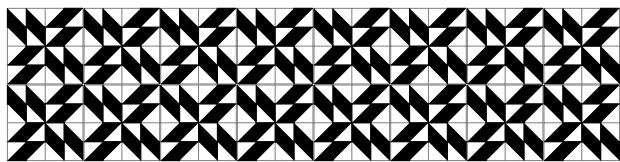
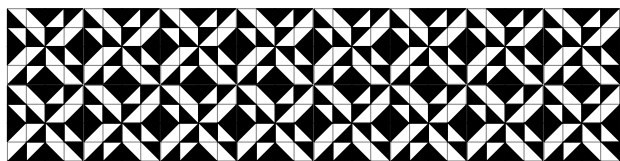
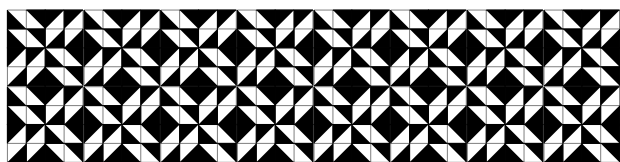
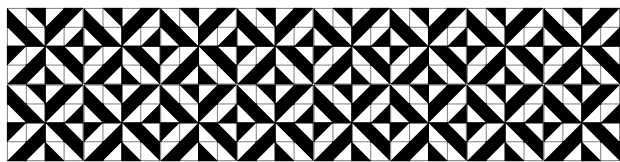
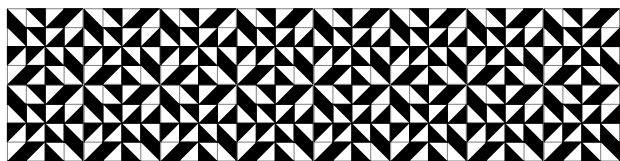
Frieze patterns for family 1101



Frieze patterns for family 1110



Frieze patterns for family 1111



Bibliography

J. Truchet and S. Truchet. *Methode pour faire une infinité de desseins differens, avec des carreaux mi-partis de deux couleurs par une ligne diagonale : ou Observations du Pere Dominique Douat... sur un Memoire inseré dans l'Histoire de l'Academie Royale des Sciences de Paris l'année 1704 présenté par... Sebastien Truchet...* Chez Florentin de Laulne, 1722. URL <https://books.google.ca/books?id=pK7-X6u7FCMC>.