

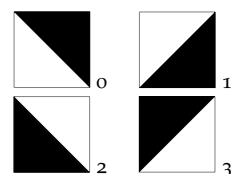
# TRUCHET BOOK (I)

4X4 PATTERNS WITH ROTATIONAL  
SYMMETRY



# Introduction

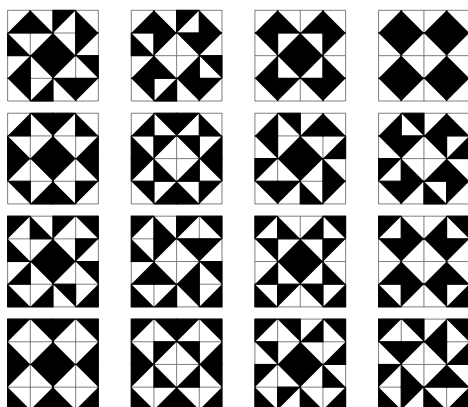
This booklet presents a complete listing of 4x4 Truchet tile patterns with rotational symmetry. Truchet tiles are, traditionally, square tiles that are divided by a diagonal line, and coloured with two colours, one on either side of the diagonal. Each tile can be rotated to one of four positions.



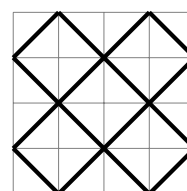
Each 4x4 Truchet tile pattern with rotational symmetry has a core 2x2 pattern in one of its quadrants that is rotated to produce the overall pattern. In this booklet, the core pattern is assumed to be in the lower left. Each pattern can be identified as a sequence of 4 digits *abcd* that list the rotational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

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

We can group these tile patterns into families where Truchet 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.

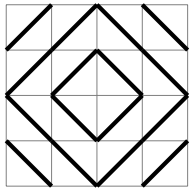
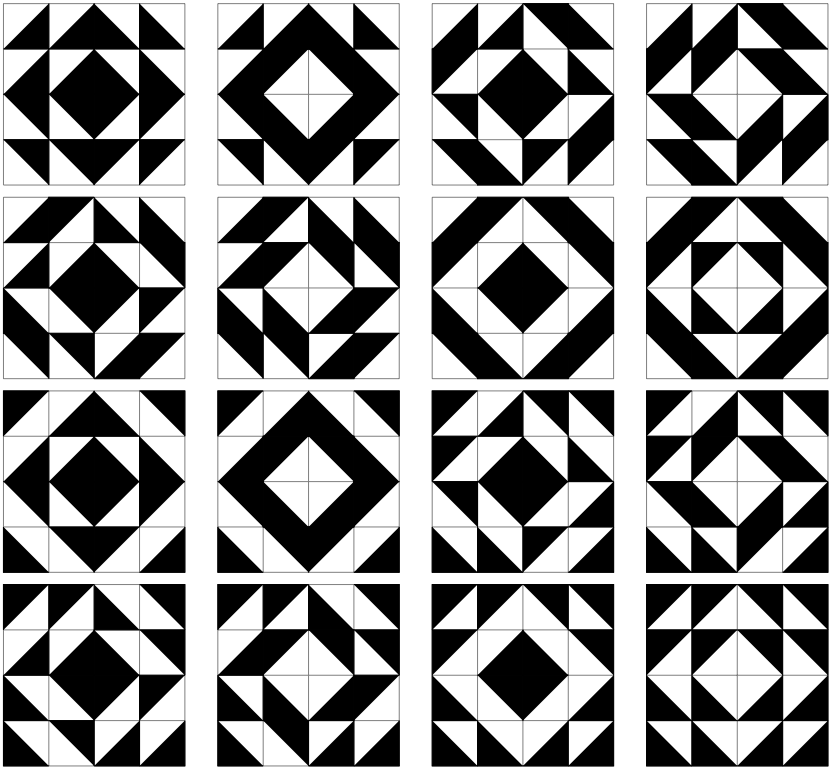


*The 0110 pattern family*

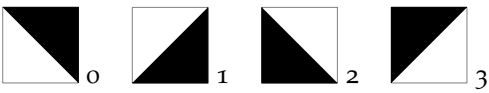


*The 0110 family pattern*

0000



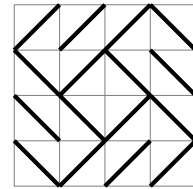
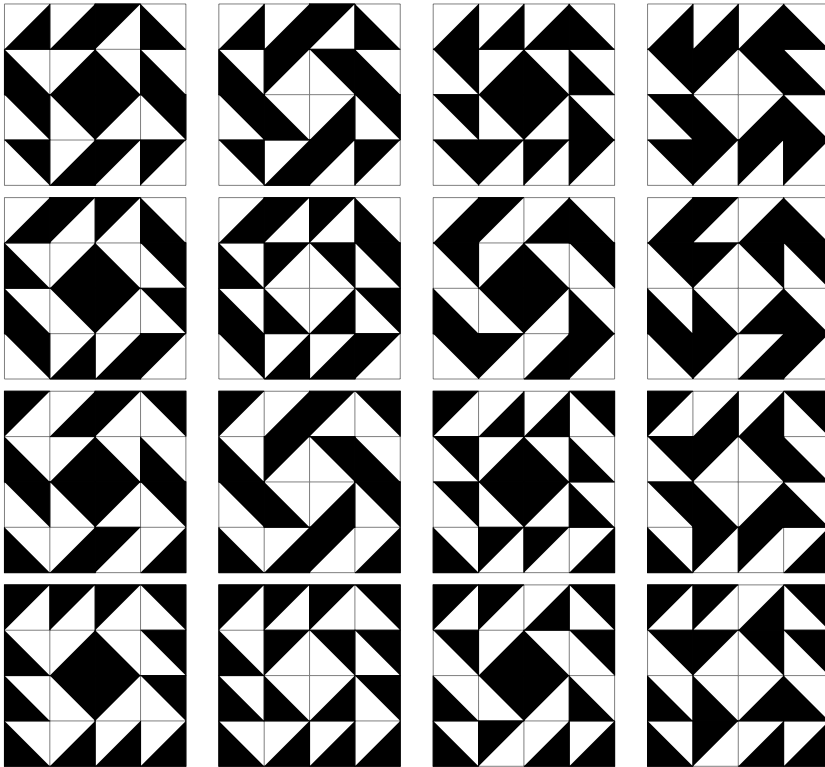
0000 0002 0020 0022  
0200 0202 0220 0222  
2000 2002 2020 2022  
2200 2202 2220 2222



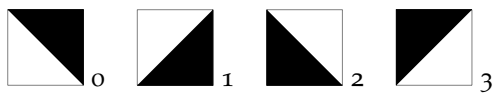
a	q	c	a
c	p	p	q
b	d	d	c
a	c	b	a



0010

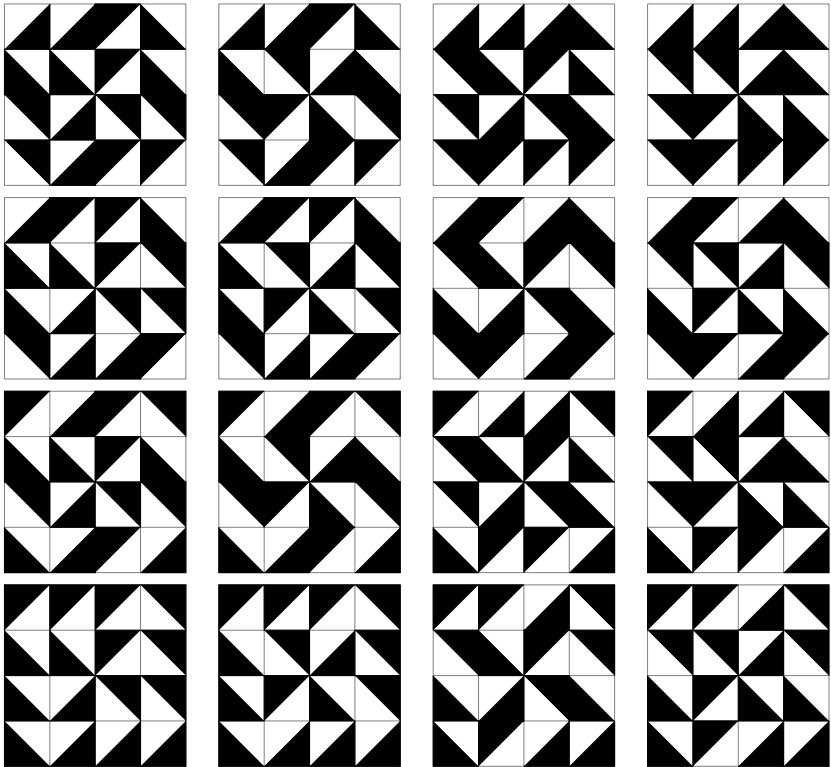
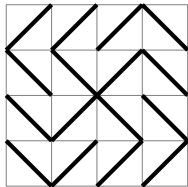


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 0210 0212 0230 0232  
 2010 2012 2030 2032  
 2210 2212 2230 2232

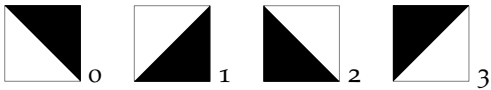


a	q	c	e
c	p	p	q
b	d	d	c
a	c	b	a

0011

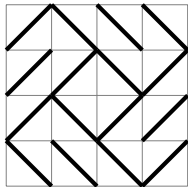
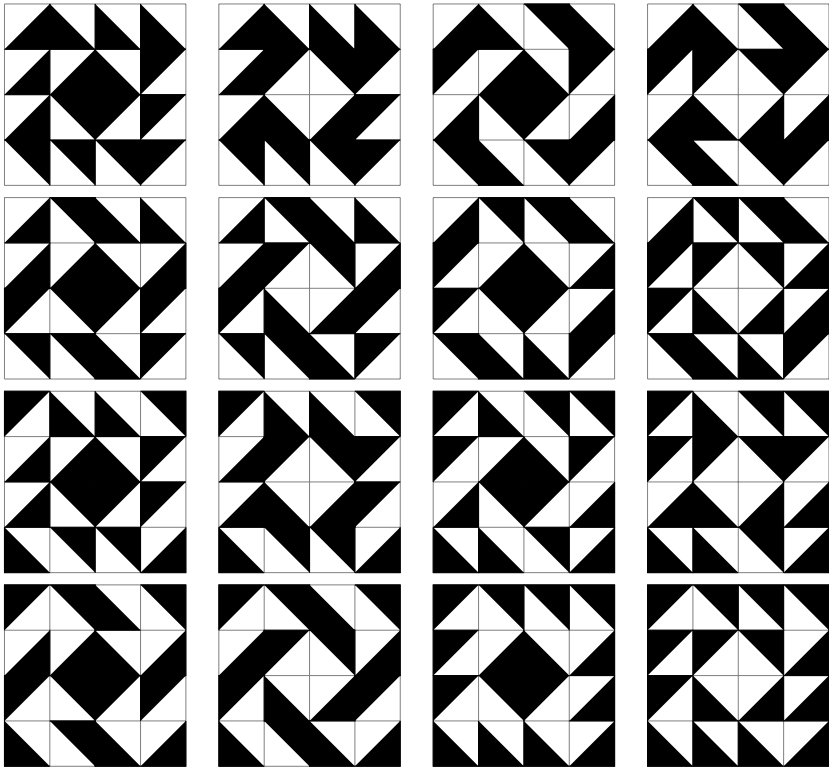


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0211 0213 0231 0233  
2011 2013 2031 2033  
2211 2213 2231 2233

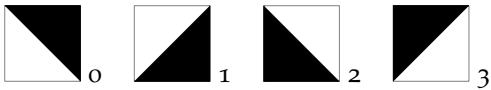


a	q	c	e
c	p	p	q
b	d	d	c
a	c	b	a

0100



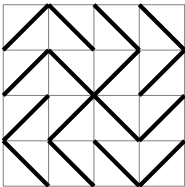
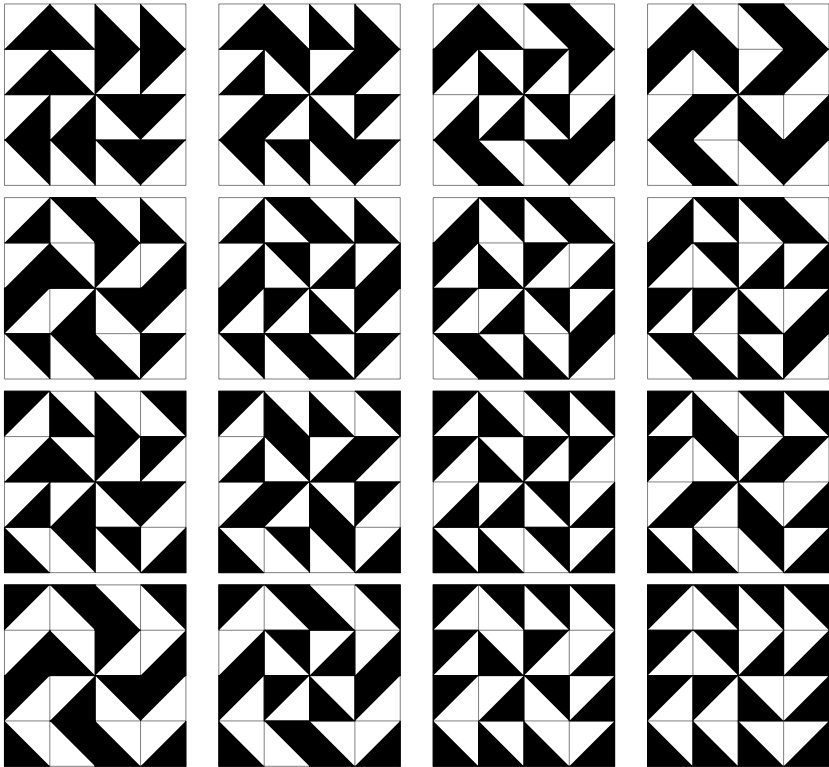
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0300 0302 0320 0322  
2100 2102 2120 2122  
2300 2302 2320 2322



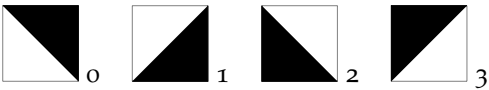
a	q	c	e
c	p	p	q
b	d	d	c
a	c	b	a



# 0101

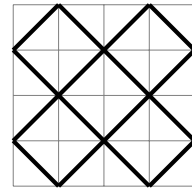
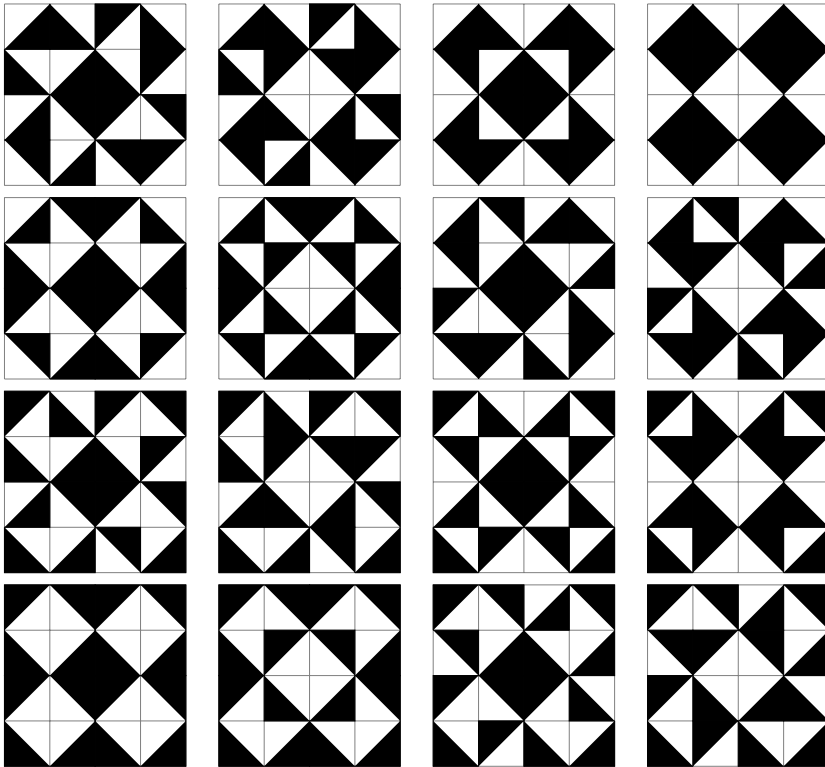


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0301   0303   0321   0323  
2101   2103   2121   2123  
2301   2303   2321   2323

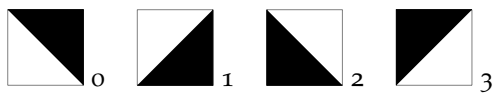


a	q	c	e
c	p	p	q
b	d	d	c
a	c	b	a

0110

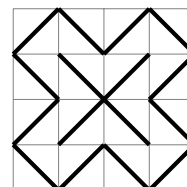
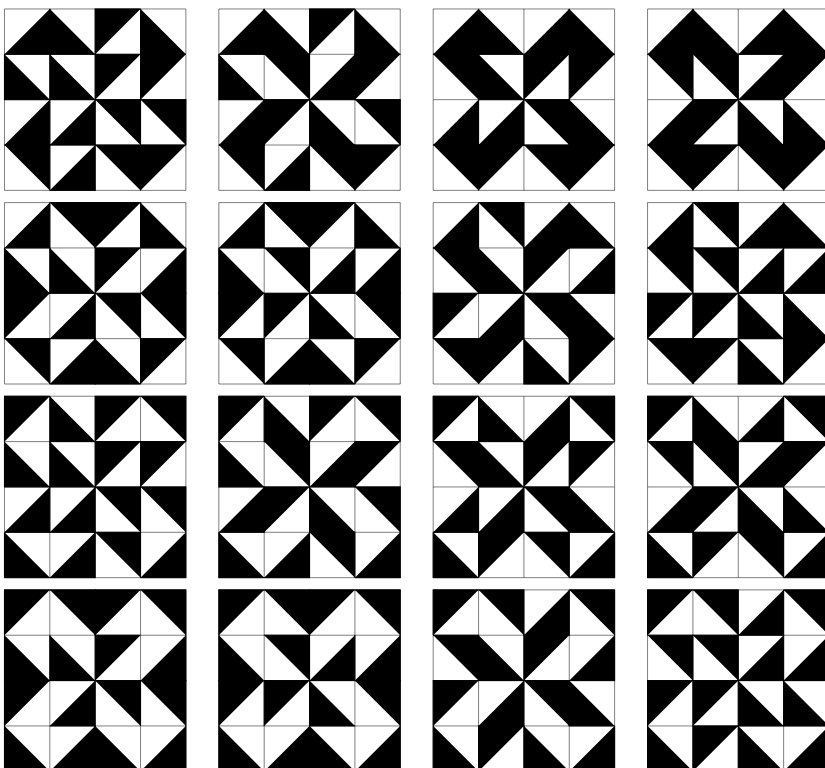


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 2310 2312 2330 2332

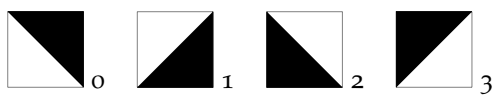


a	q	c	e
c	p	p	q
b	d	d	c
a	c	b	a

0111

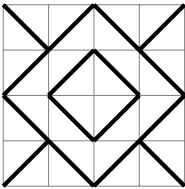
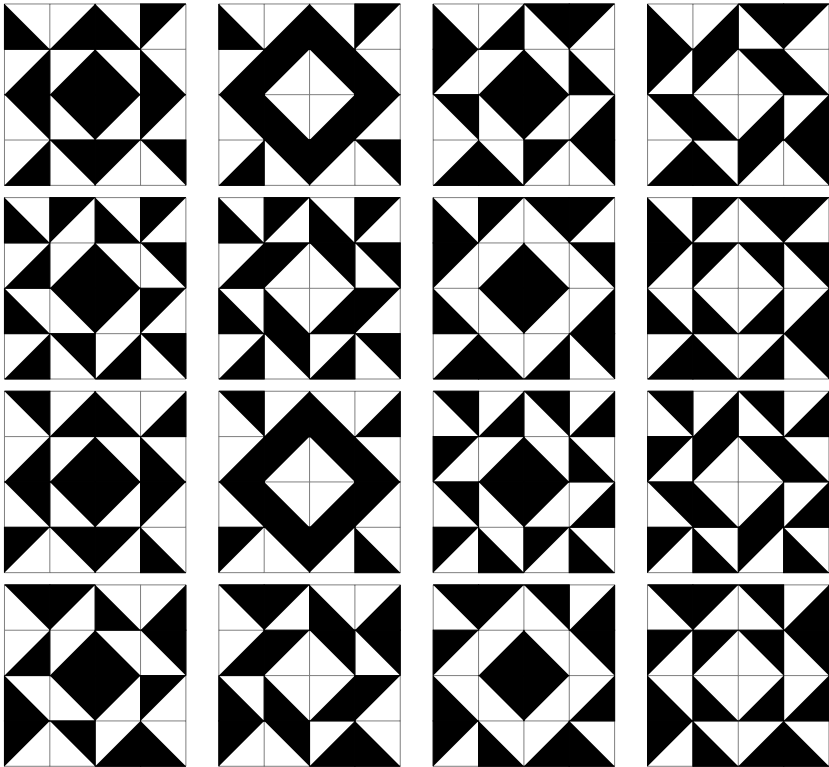


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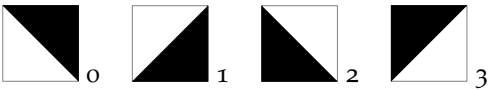


a	q	c	e
c	p	p	q
b	d	d	c
a	c	b	a

1000

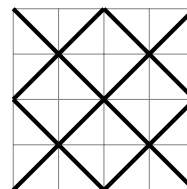
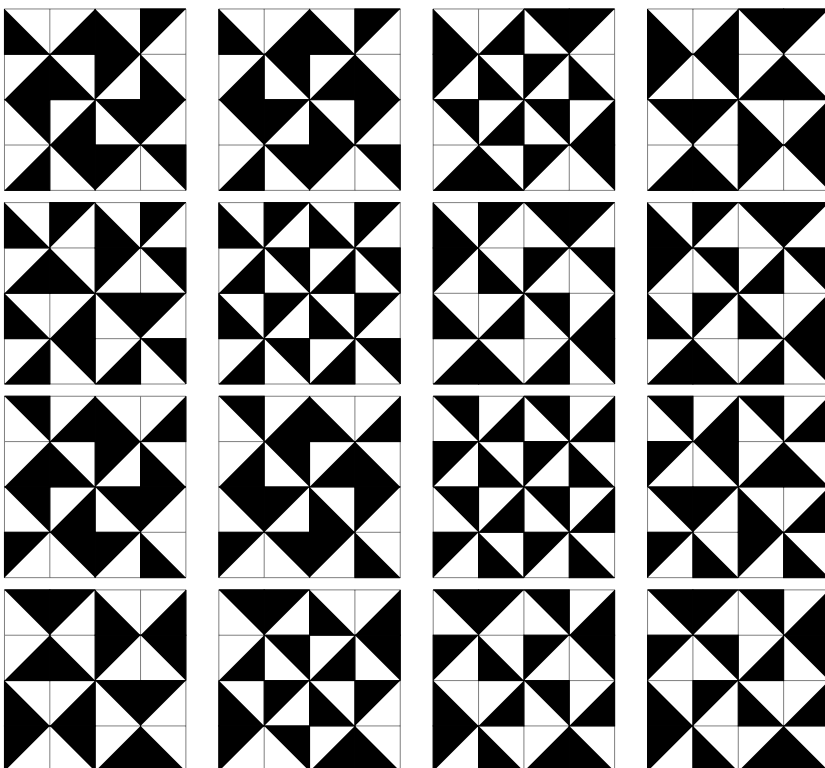


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3000   3002   3020   3022  
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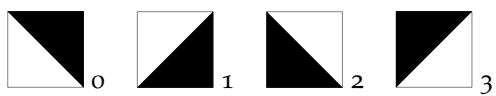


a	q	c	e
c	p	p	q
b	d	d	c
a	c	b	a

1001

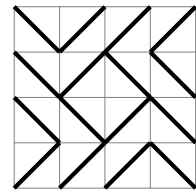
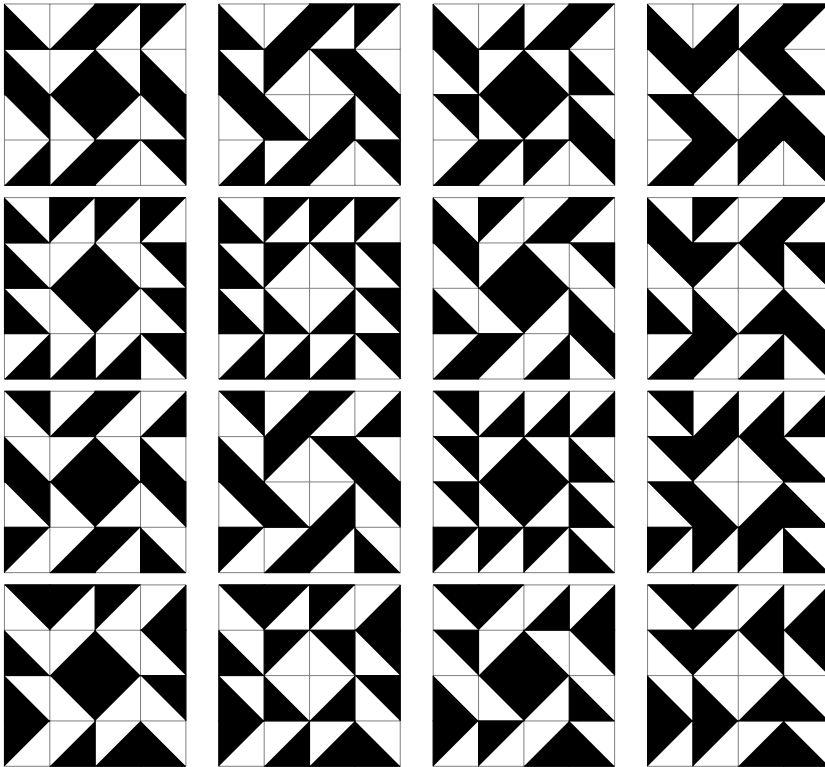


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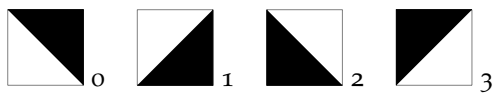


a	q	c	e
c	p	p	q
b	d	d	c
a	c	b	a

1010

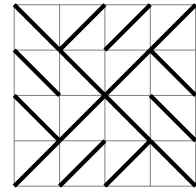
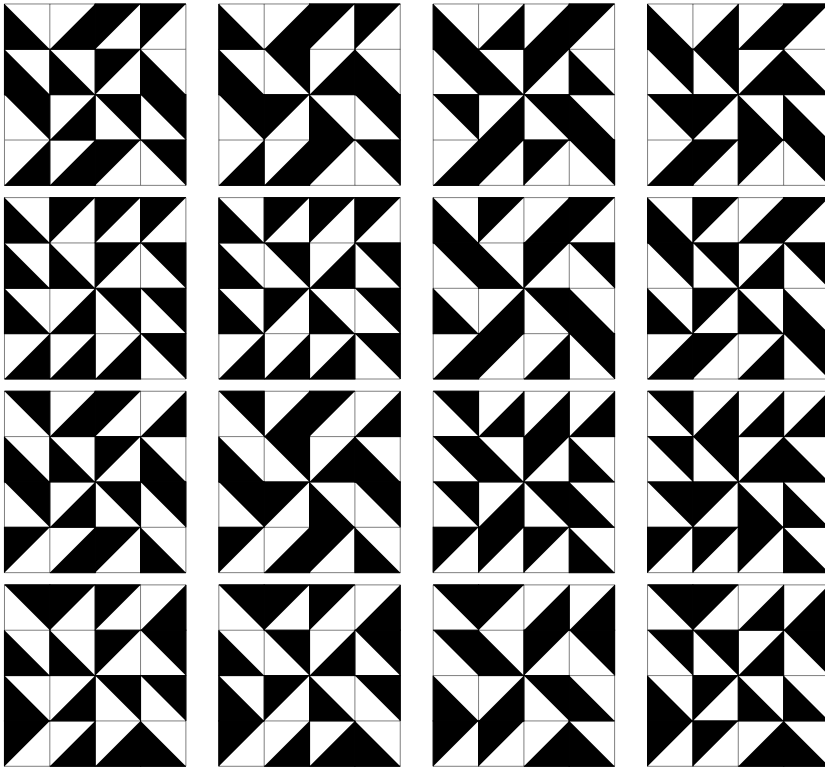


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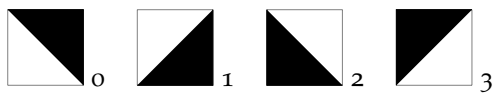


a	q	c	e
c	p	p	q
b	d	d	c
a	c	b	a

1011

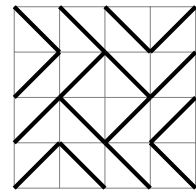
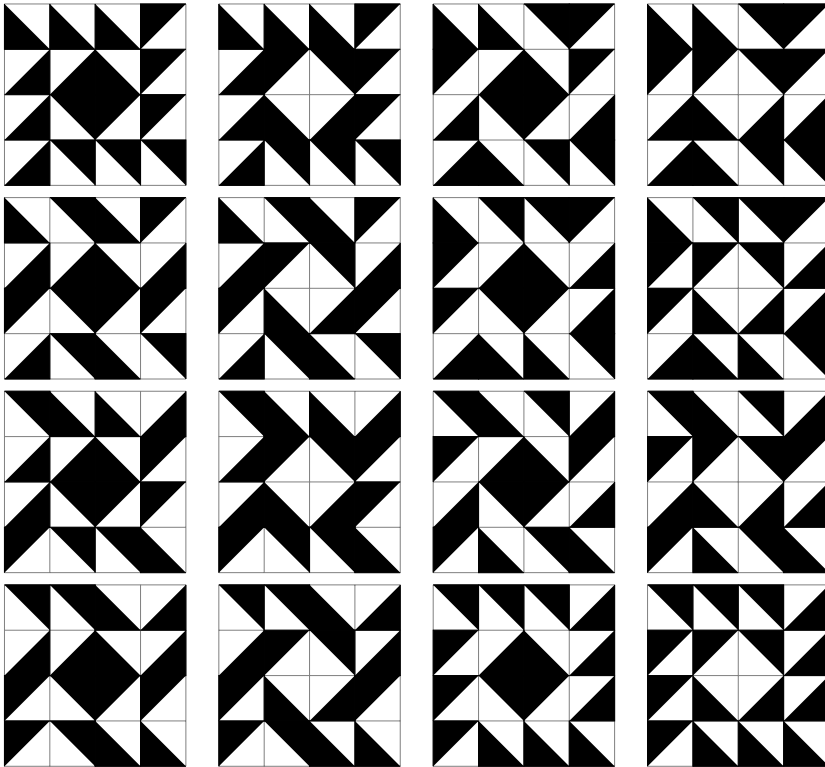


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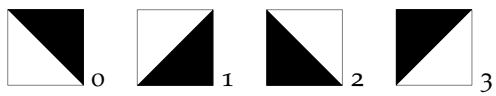


a	q	c	e
c	p	p	q
b	d	d	c
a	c	b	a

1100



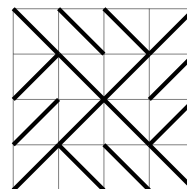
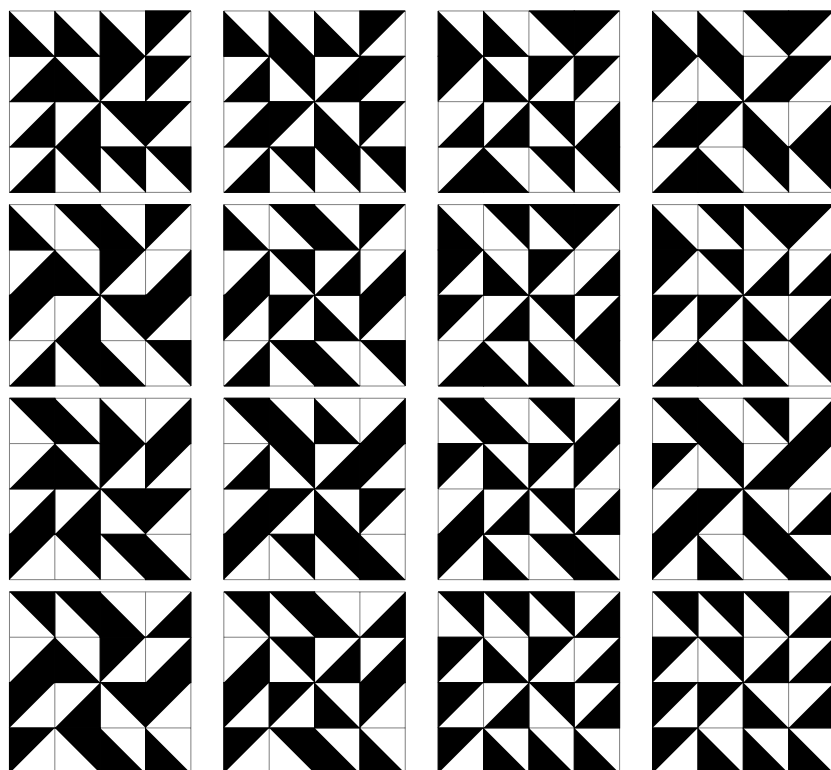
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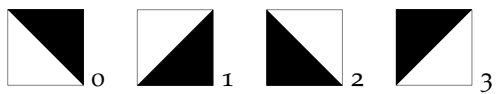
a	q	c	e
c	p	p	q
b	d	d	c
a	c	b	a



# 1101

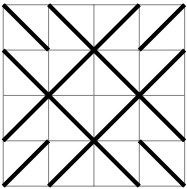
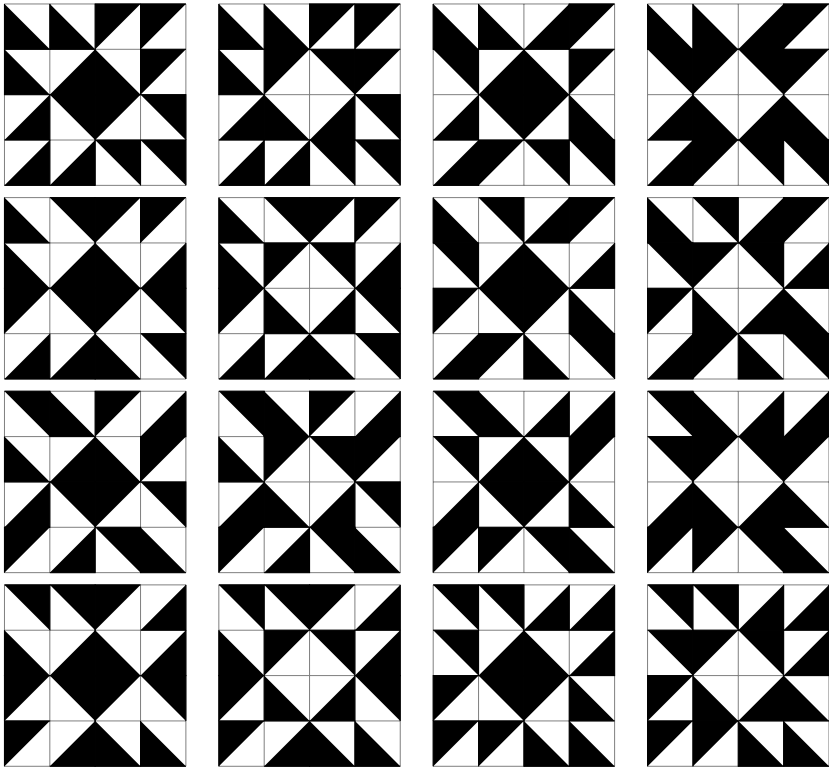


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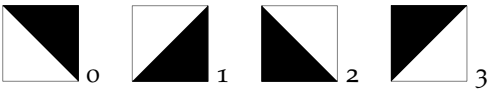


a	q	c	e
c	p	p	q
b	d	d	c
a	c	b	a

1110

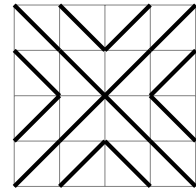
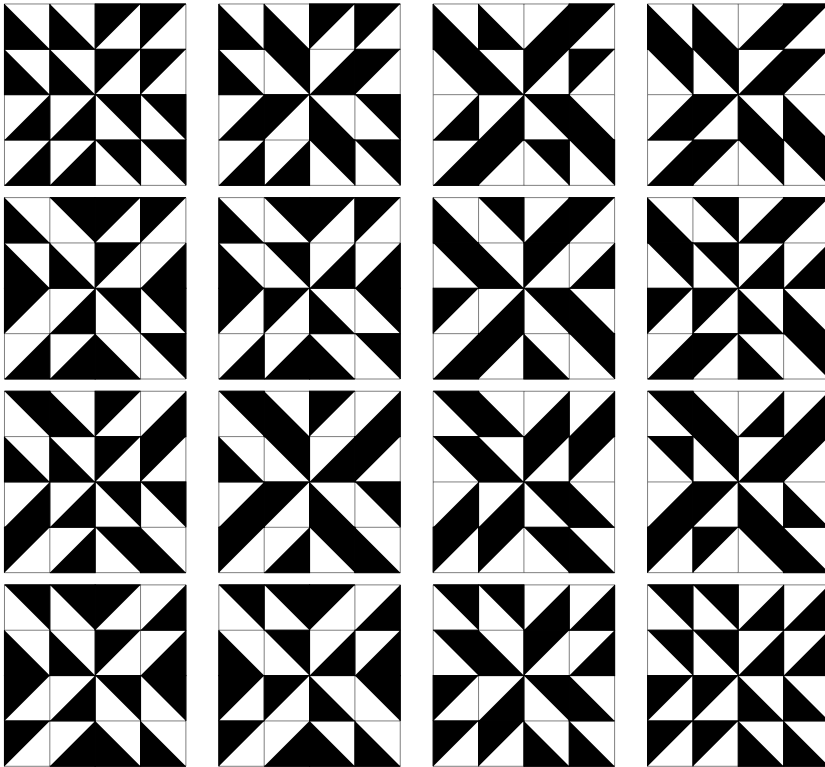


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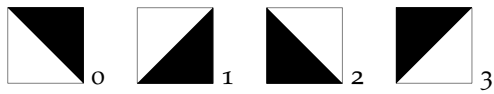


a	q	c	e
c	p	p	q
b	d	d	c
a	c	b	a

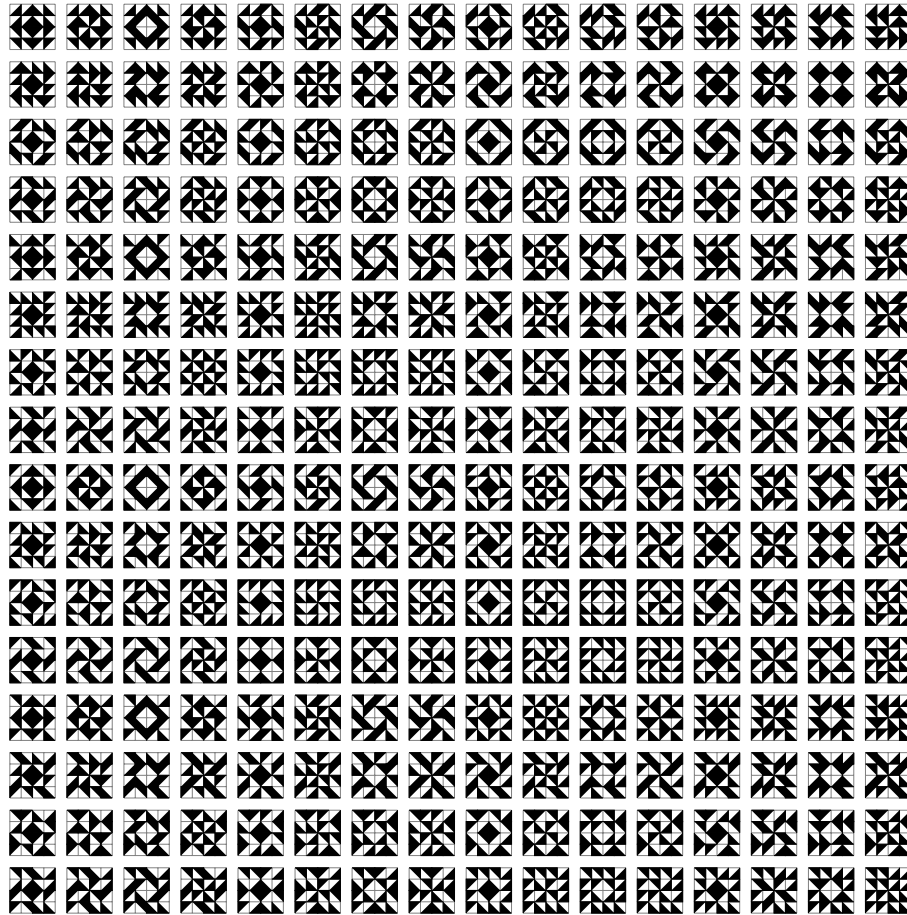
1111



1111 1113 1131 1133  
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 3111 3113 3131 3133  
 3311 3313 3331 3333



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



## *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>.