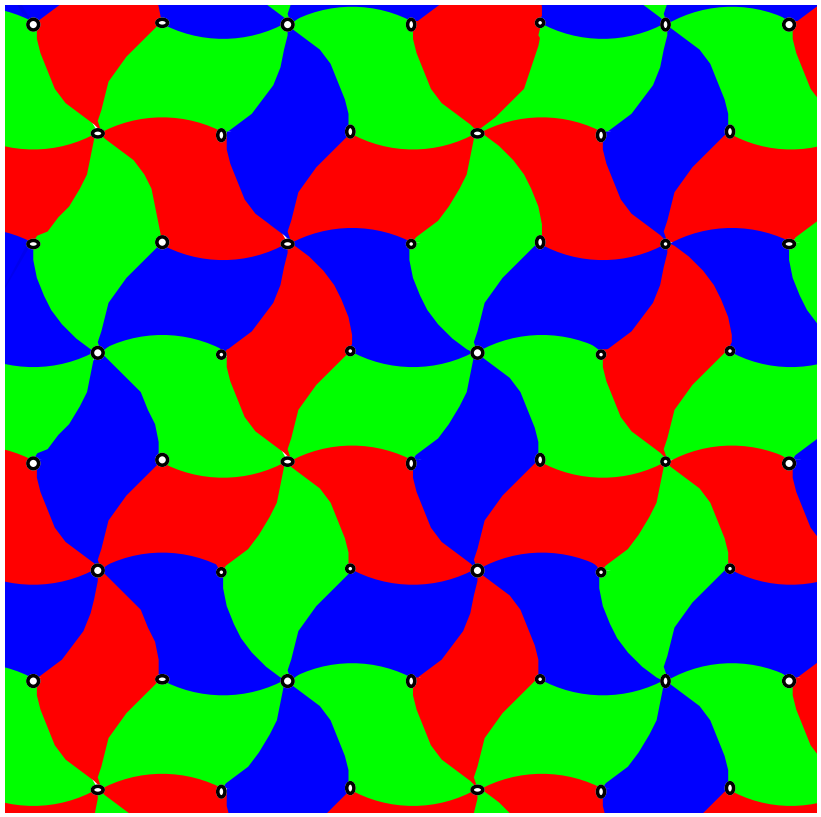
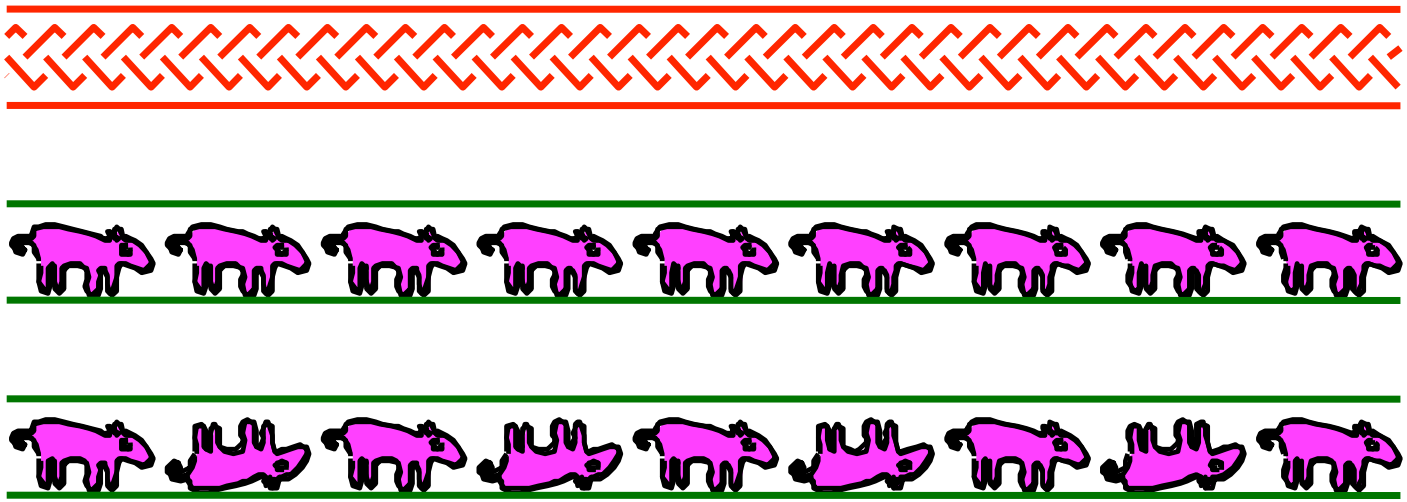


Modul 204 Bandornamente und Flächenornamente



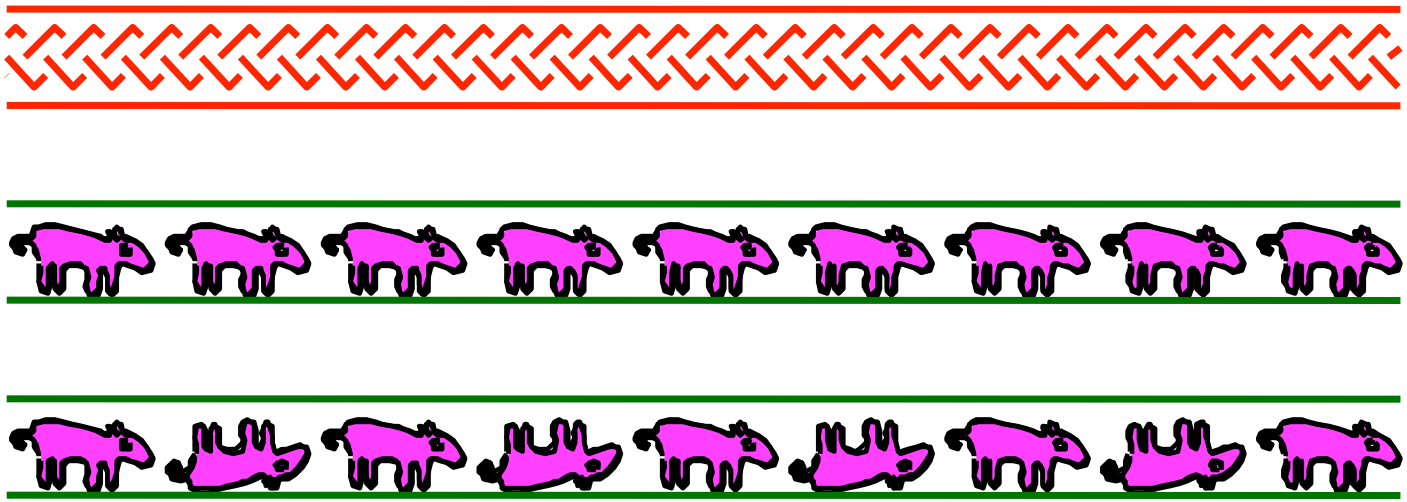
Wie viele Bandornamente gibt es?

Wie viele Bandornamente gibt es?

Schubspiegelsymmetrie

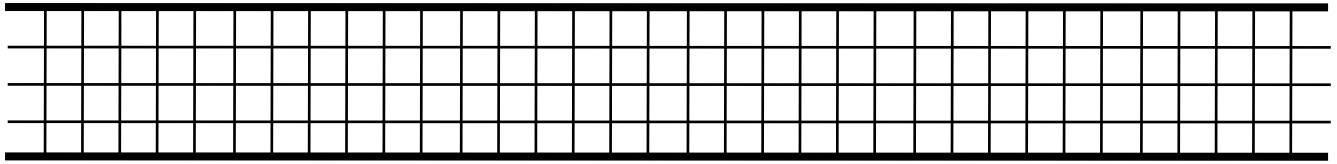
Wie viele Bandornamente gibt es?

Translationssymmetrie

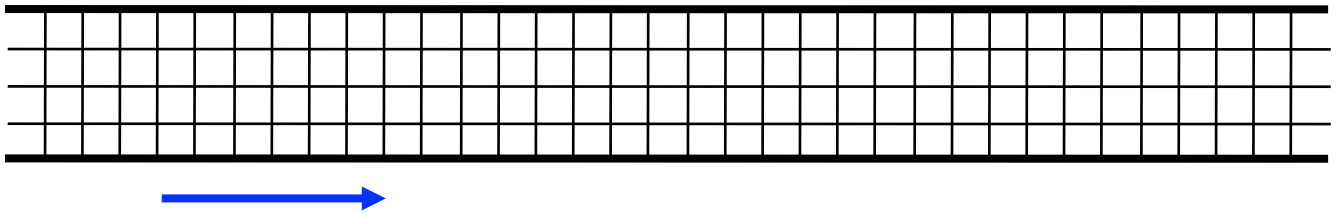


Wie viele Bandornamente gibt es?
Wie viele Symmetrieklassen gibt es?

Welche Symmetrien gibt es bei Bandornamenten?

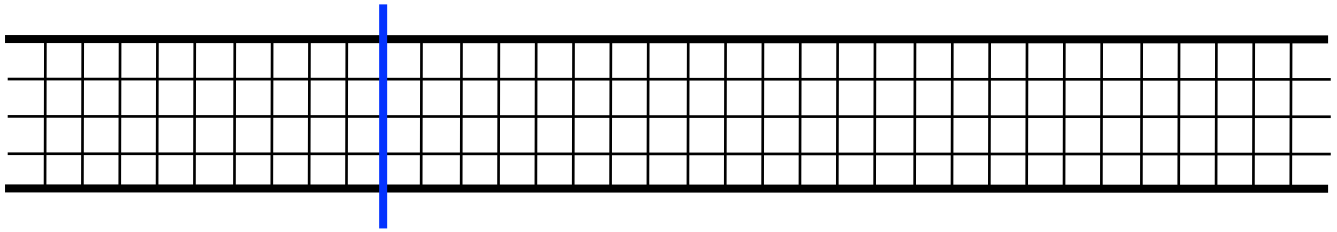


Welche Symmetrien gibt es bei Bandornamenten?



Immer: Translationssymmetrie
(gehört zur Definition eines Bandornamentes)

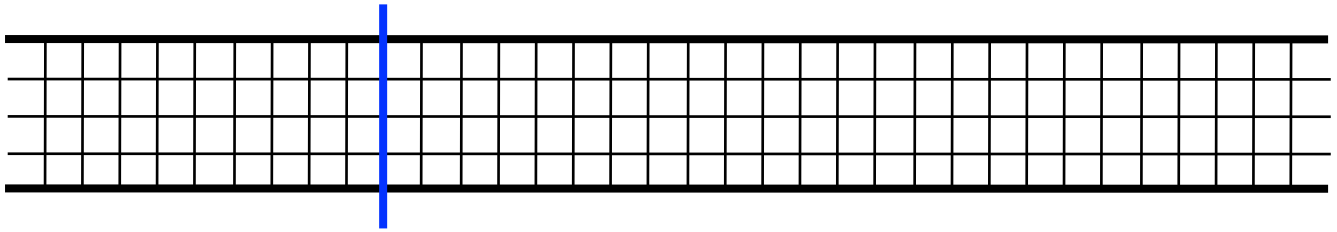
Welche Symmetrien gibt es bei Bandornamenten?



Immer: Translationssymmetrie

Achse(n) senkrecht

Welche Symmetrien gibt es bei Bandornamenten?

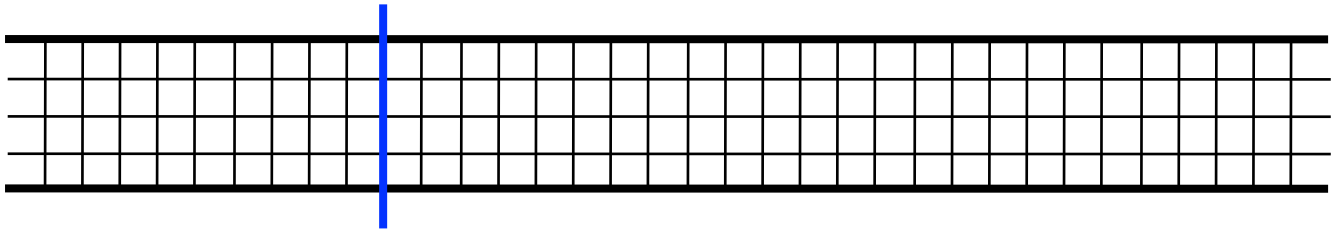


Immer: Translationssymmetrie

Achse(n) senkrecht

Plural erforderlich

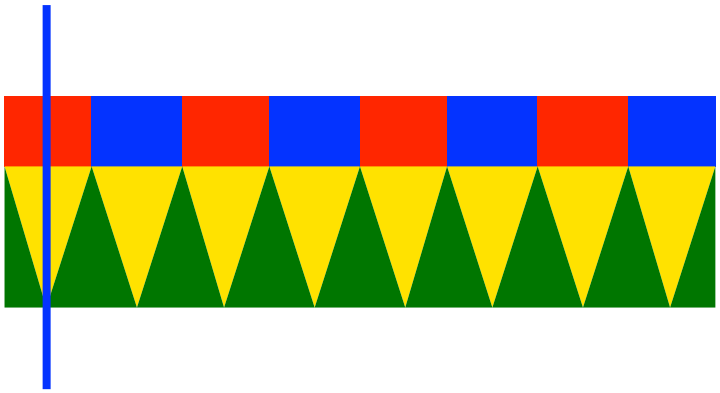
Welche Symmetrien gibt es bei Bandornamenten?



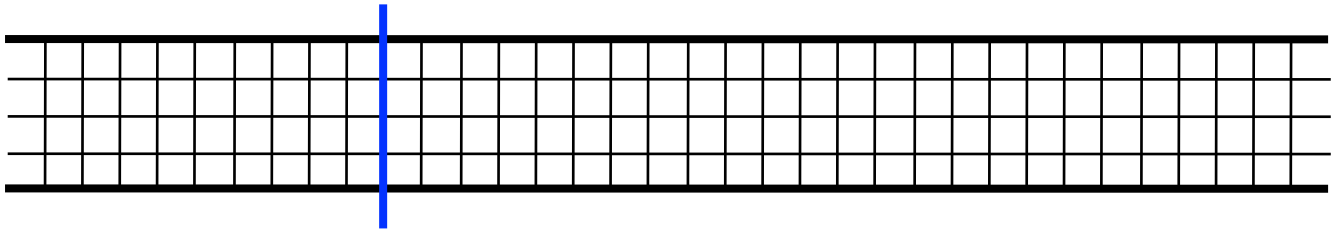
Immer: Translationssymmetrie

Achse(n) senkrecht

Plural erforderlich



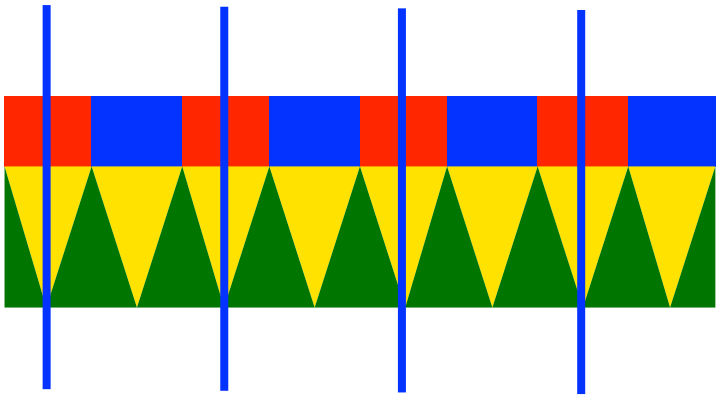
Welche Symmetrien gibt es bei Bandornamenten?



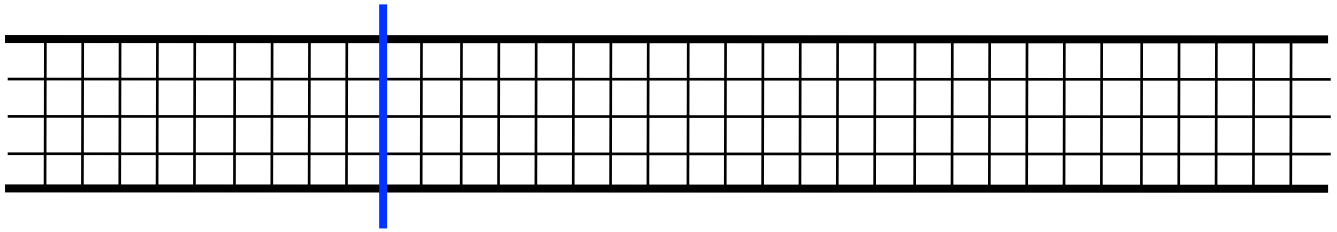
Immer: Translationssymmetrie

Achse(n) senkrecht

Plural erforderlich



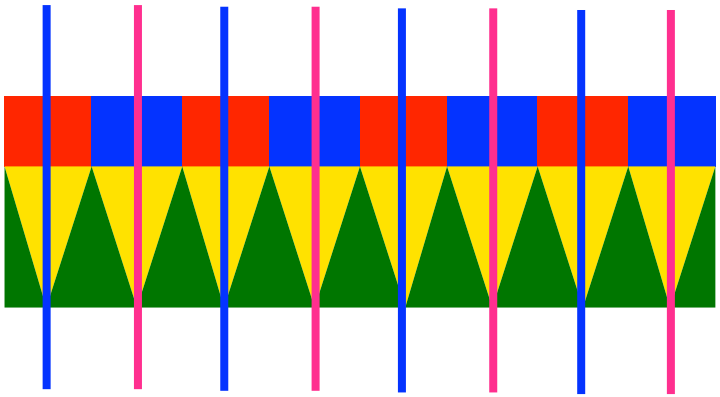
Welche Symmetrien gibt es bei Bandornamenten?



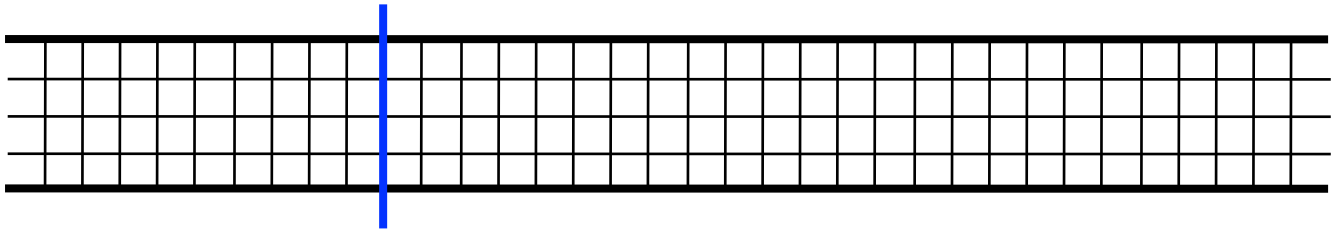
Immer: Translationssymmetrie

Achse(n) senkrecht

Plural erforderlich



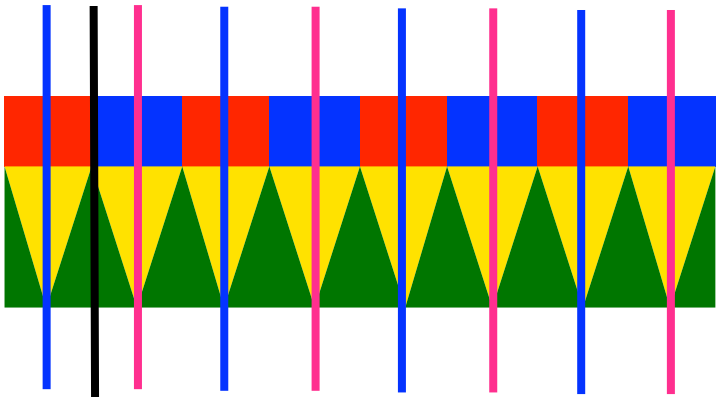
Welche Symmetrien gibt es bei Bandornamenten?



Immer: Translationssymmetrie

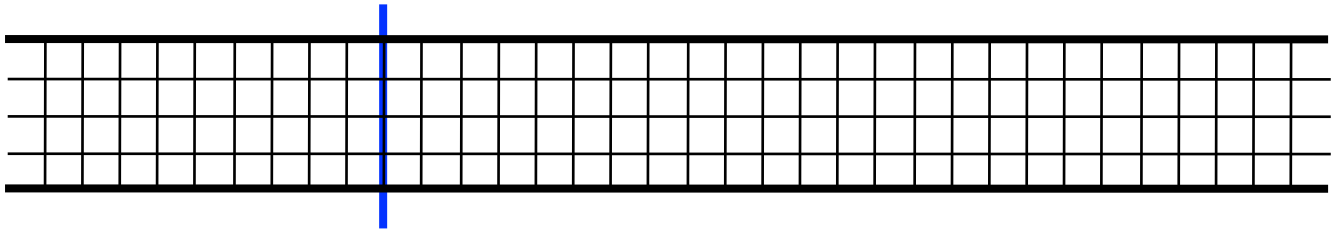
Achse(n) senkrecht

Plural erforderlich



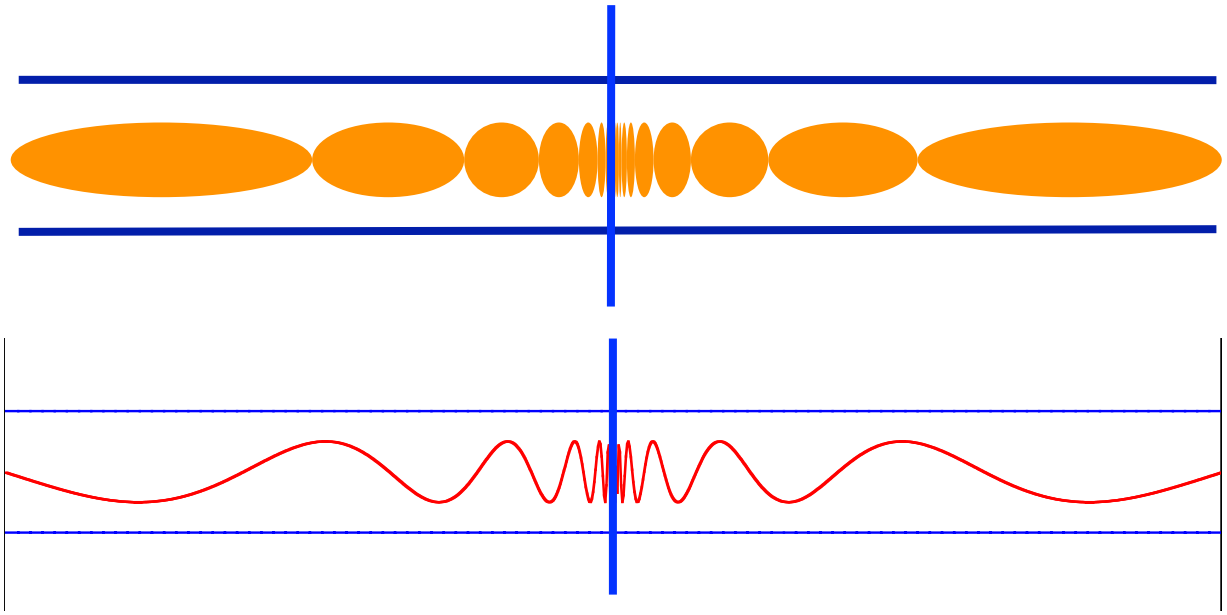
Keine Achse

Welche Symmetrien gibt es bei Bandornamenten?

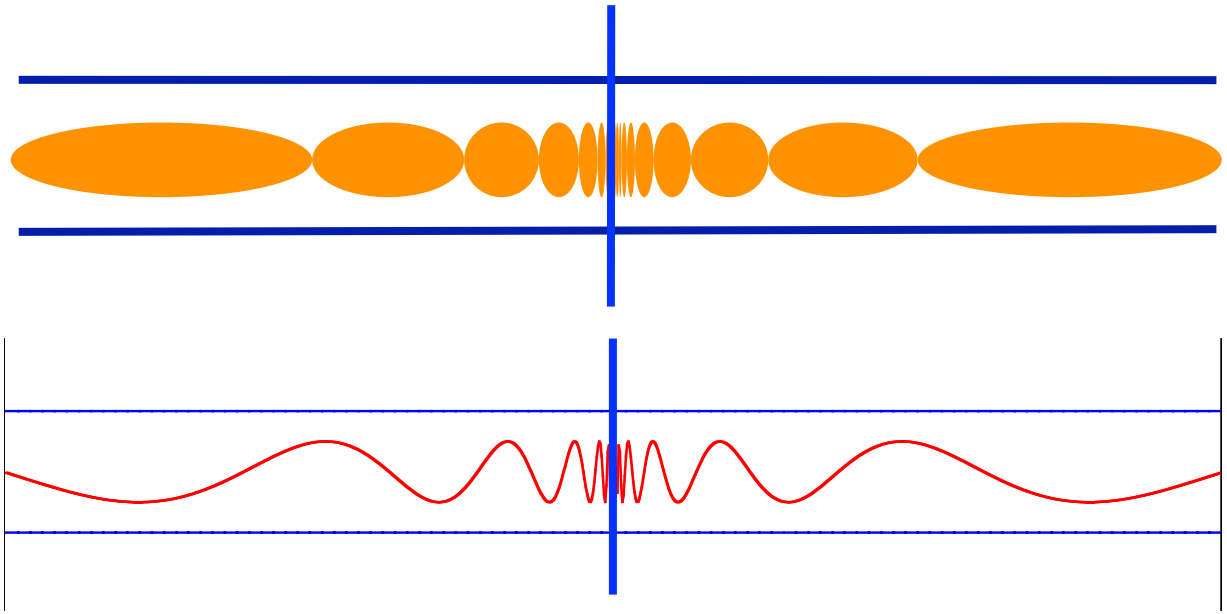


Immer: Translationssymmetrie

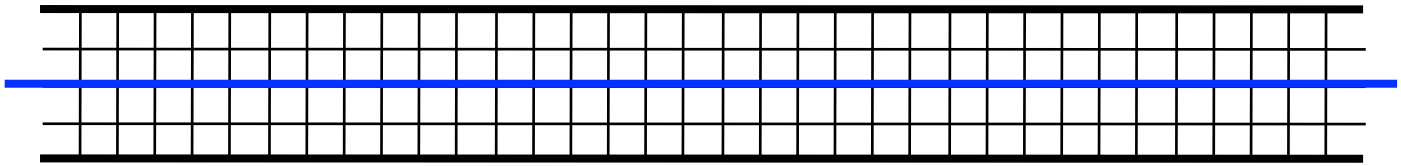
Achse(n) senkrecht



Keine Bandornamente
Translationssymmetrie fehlt

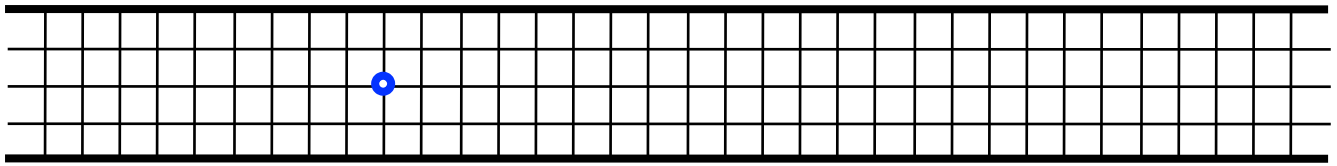


Welche Symmetrien gibt es bei Bandornamenten?



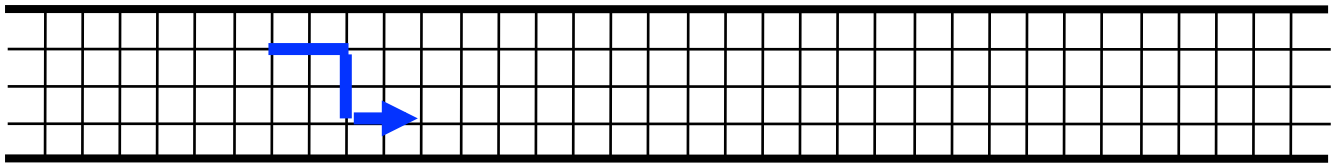
Immer: Translationssymmetrie
Achse(n) senkrecht
Achse waagerecht

Welche Symmetrien gibt es bei Bandornamenten?



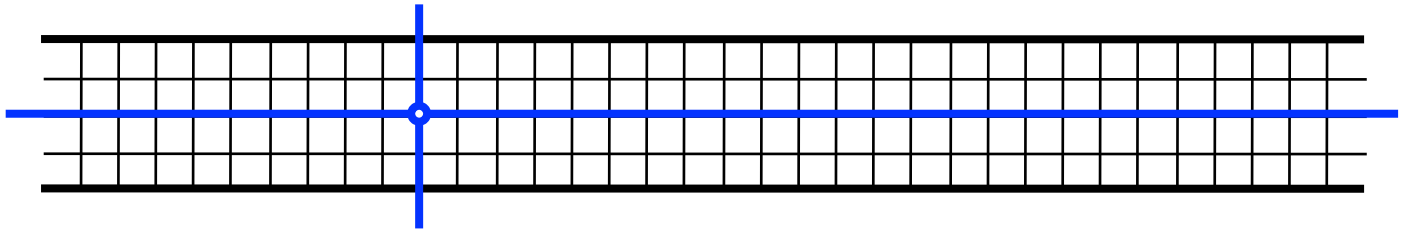
Immer: Translationssymmetrie
Achse(n) senkrecht
Achse waagerecht
Spiegelzentren

Welche Symmetrien gibt es bei Bandornamenten?



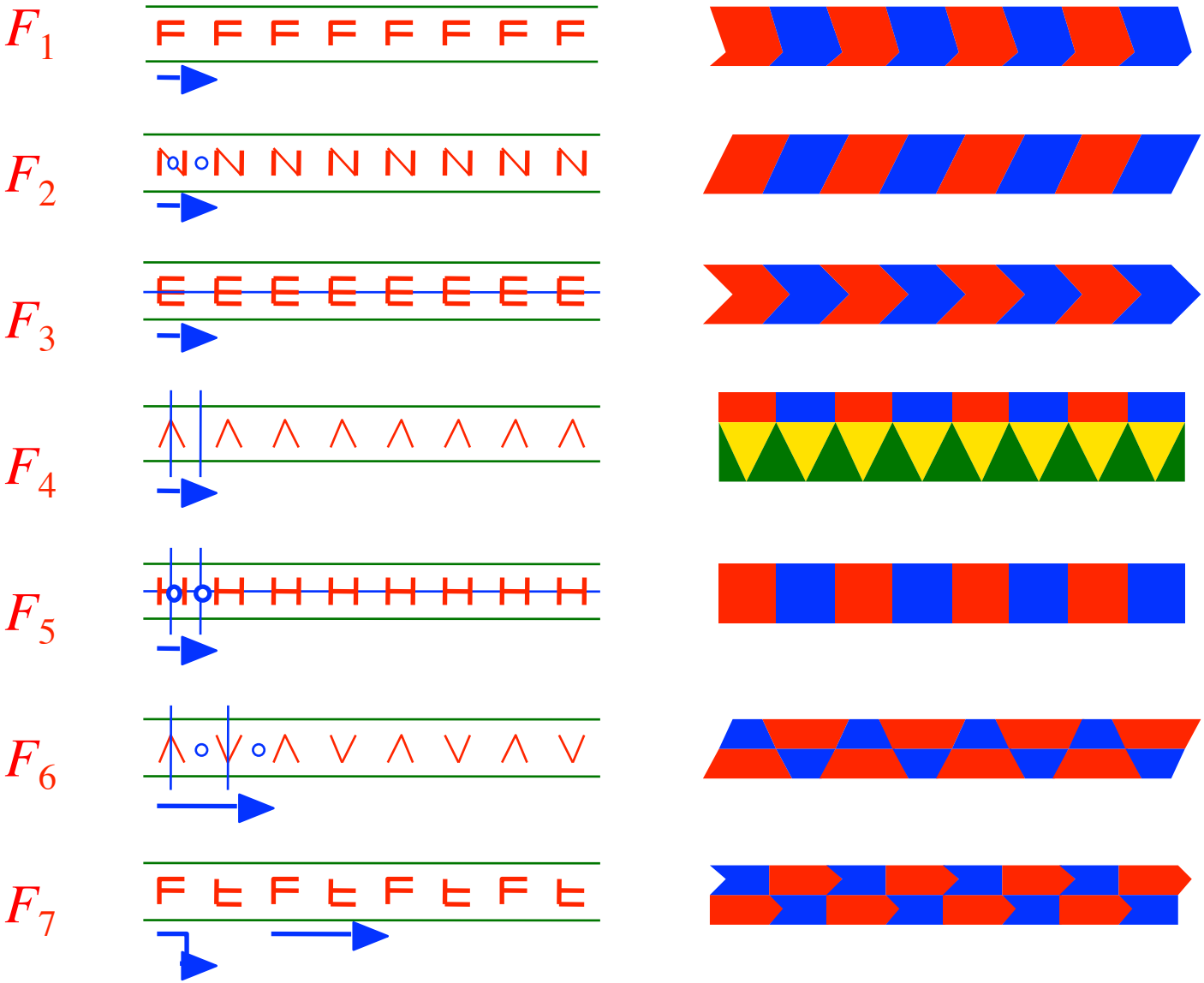
Immer: Translationssymmetrie
Achse(n) senkrecht
Achse waagerecht
Spiegelzentren
Schubspiegelungen

Welche Symmetrien gibt es bei Bandornamenten?

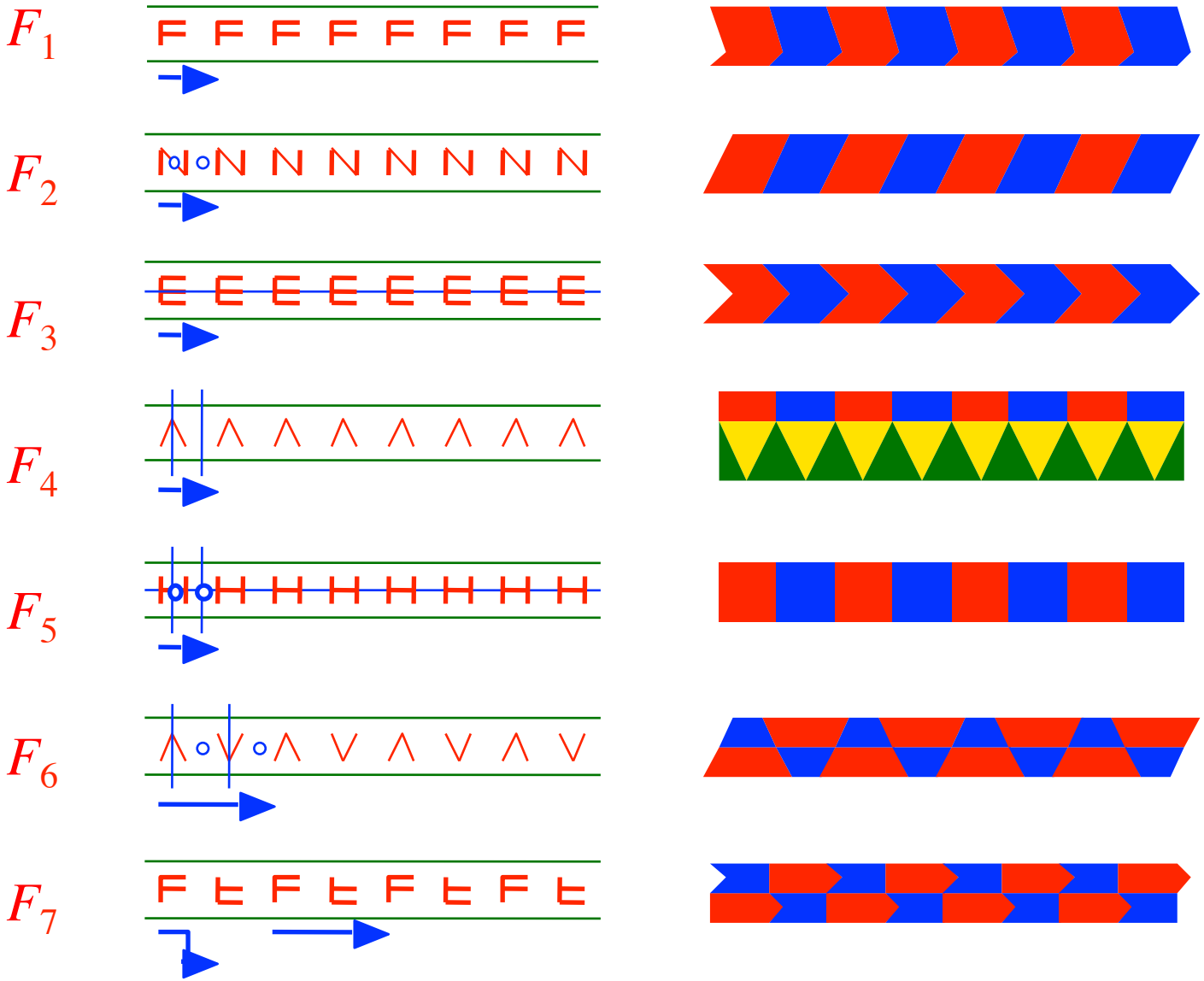


Immer: Translationssymmetrie
Achse(n) senkrecht
Achse waagerecht
Spiegelzentren
Schubspiegelungen

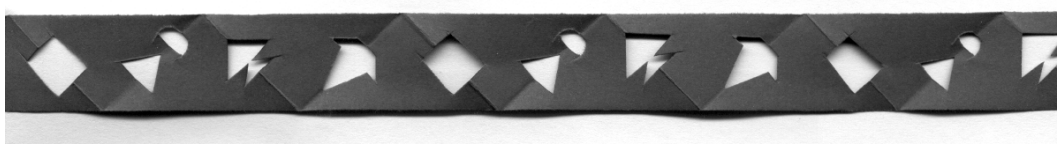
Kombinationen davon


F_1
F_2
F_3
F_4
F_5
F_6
F_7

Hands on Geometry: Ein Beispiel als Scherenschnitt



F_1 Nur Translationen



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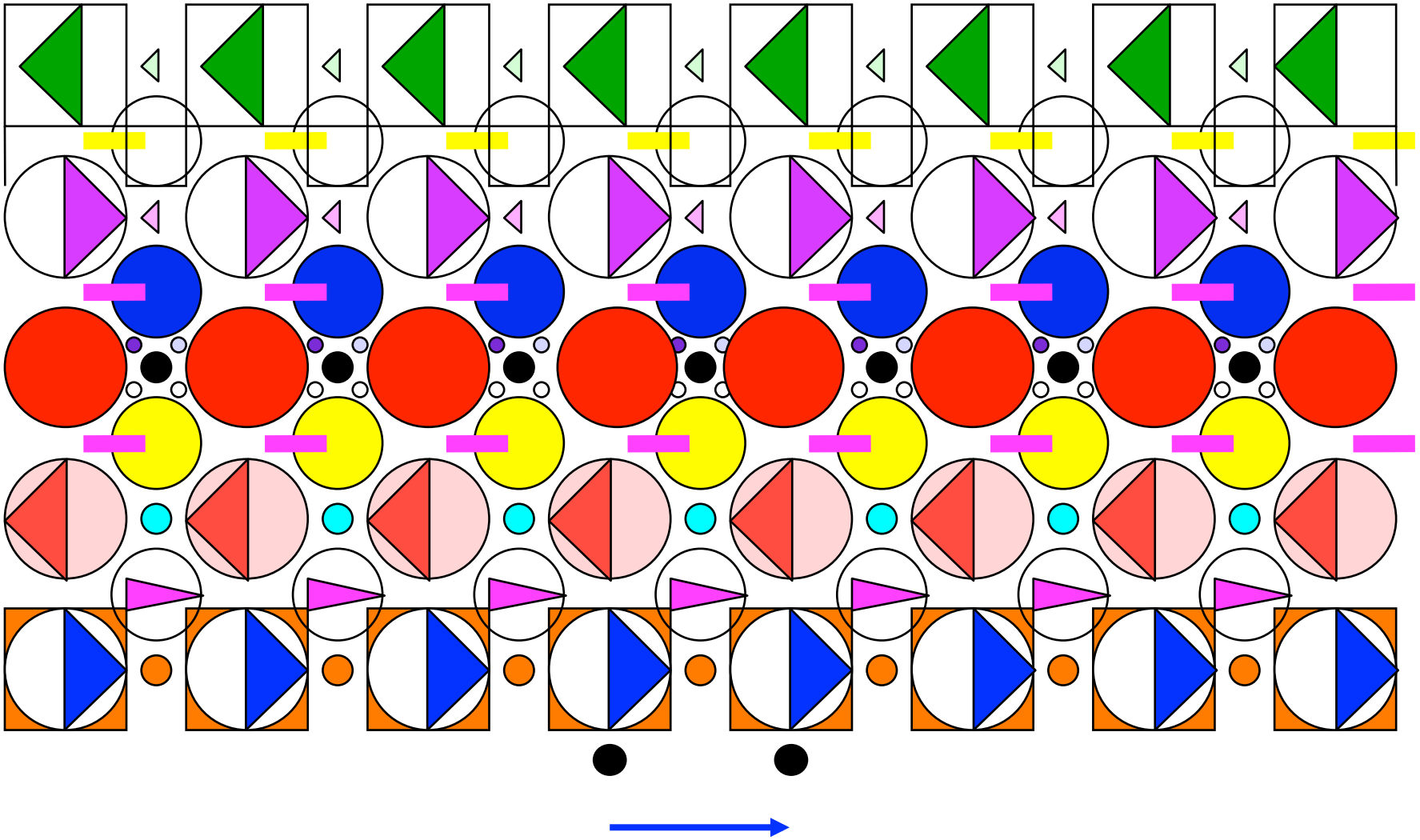
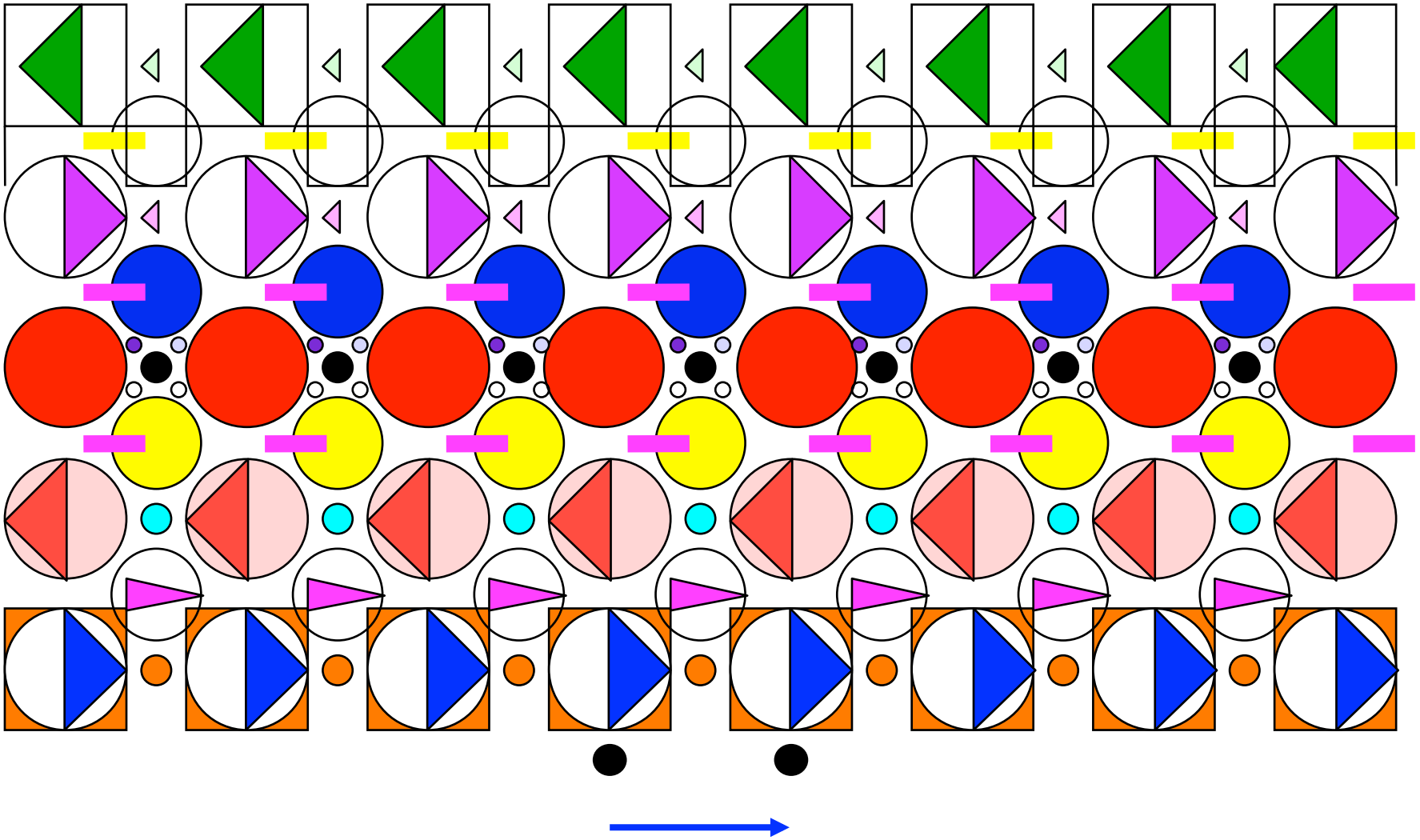
Siehe Anhang im Skript

F_1 Nur Translationen

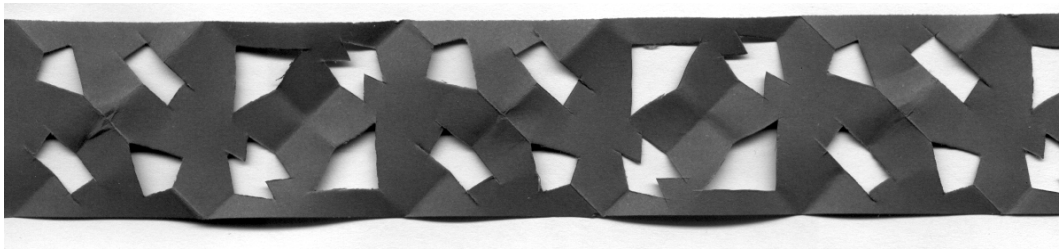


Siehe Anhang im Skript

F_1 Nur Translationen



F_2 Translationen und Punktspiegelungen



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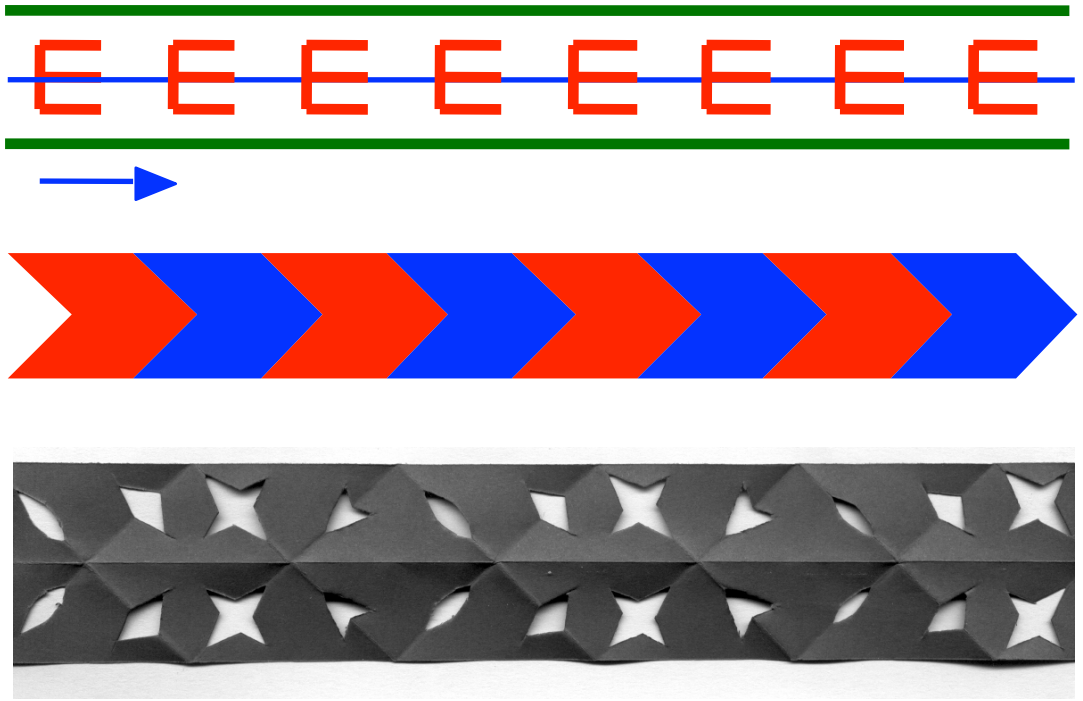
F_3 Translationen und Spiegelung an horizontaler Achse



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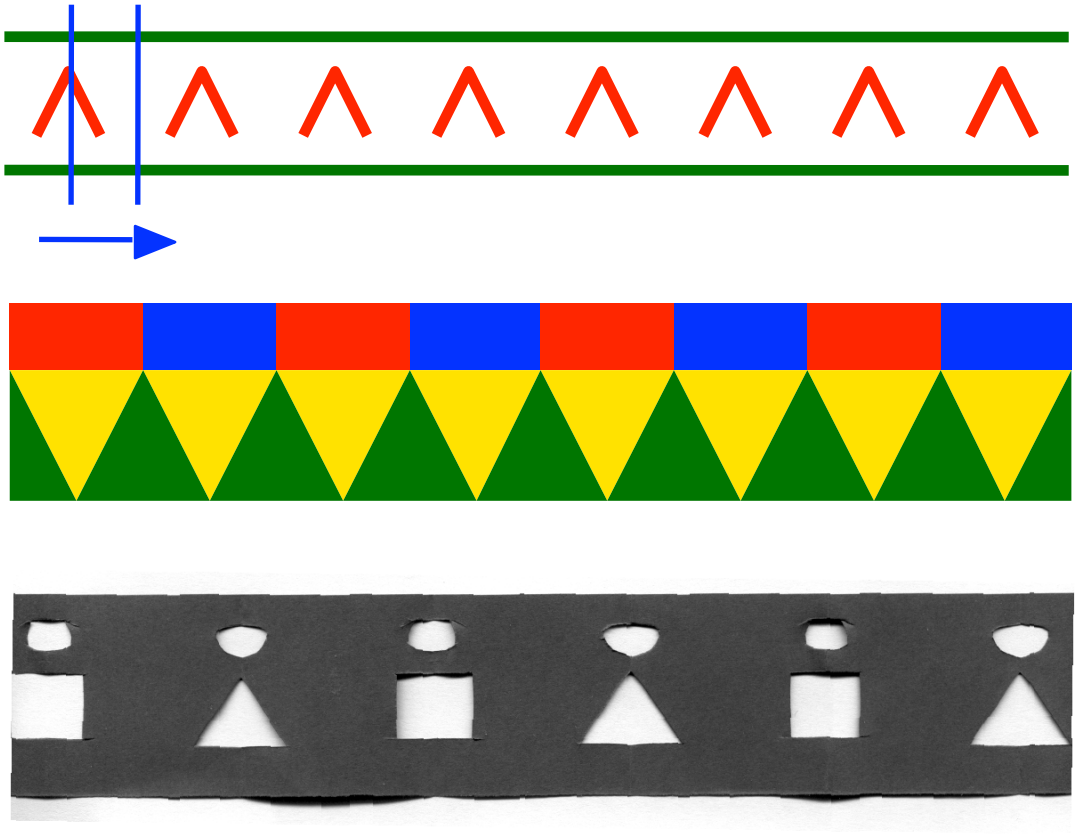
F_4 Translationen und Spiegelungen an vertikalen Achsen



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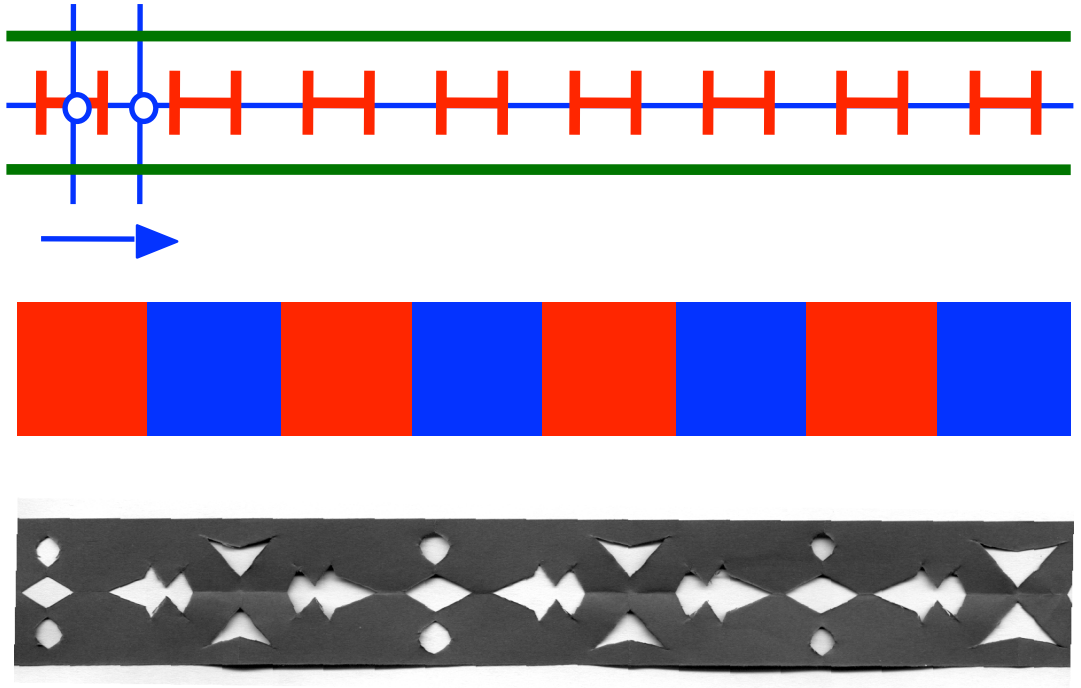
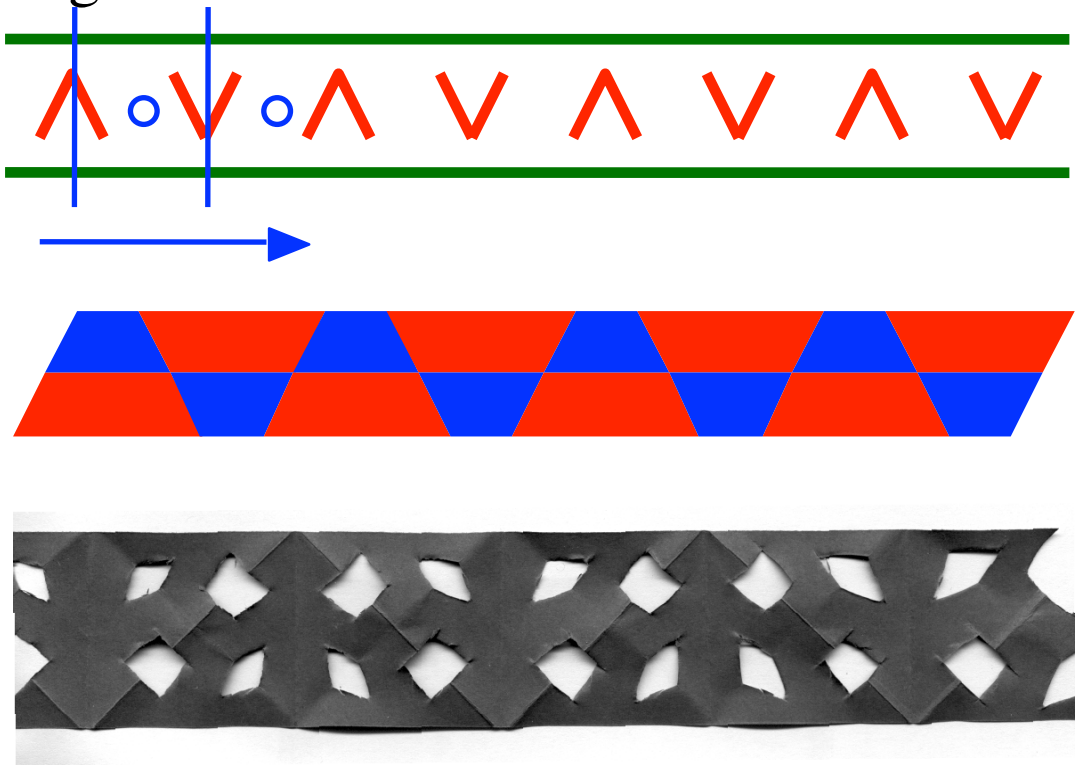
F_5 Translationen und Punktspiegelungen, Spiegelungen an vertikalen Achsen und Spiegelung an horizontaler Achse



XXXXXXXXXXXXXXXXXX

F_6 Translationen und Punktspiegelungen sowie Spiegelungen an vertikalen Achsen



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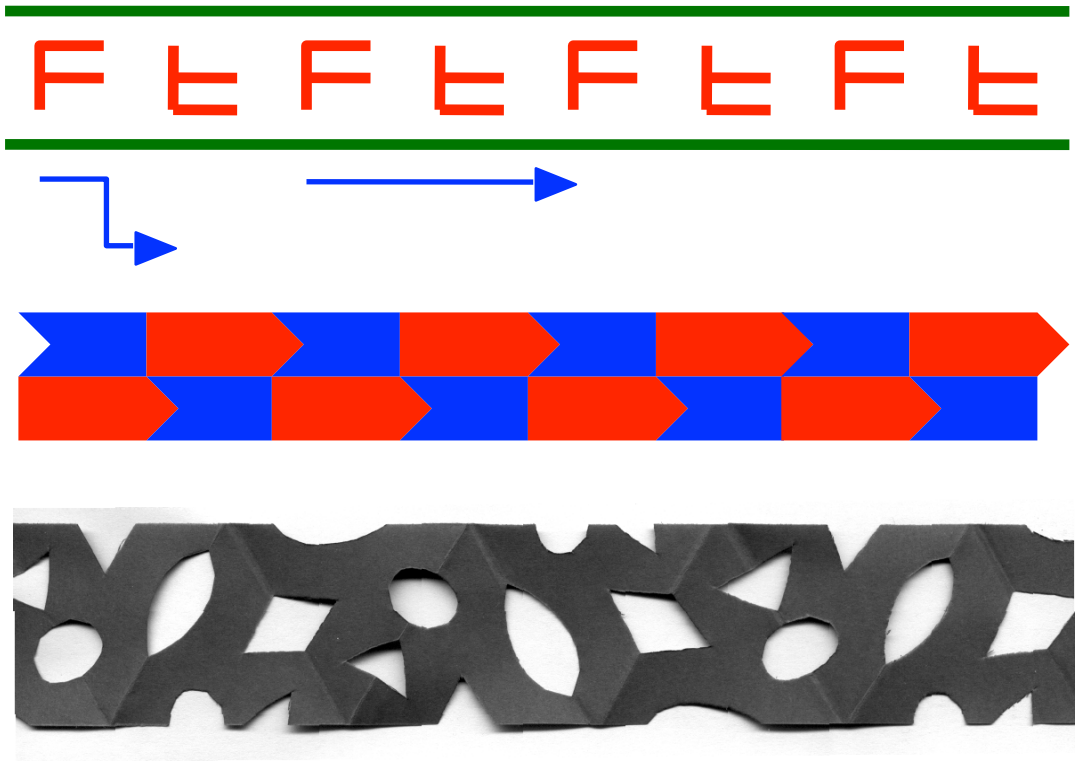
F_7 Translationen und Schubspiegelungen



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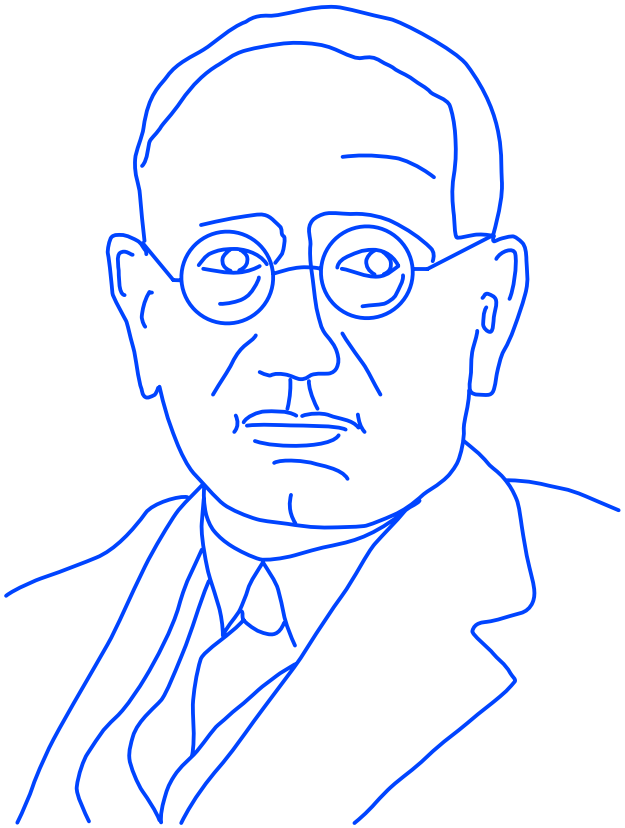
Flächenornamente und Parkette

Wie viele Symmetrieklassen gibt es bei zweidimensionalen Ornamenten?

Flächenornamente und Parkette



Wie viele Symmetrieklassen gibt es bei zweidimensionalen Ornamenten?

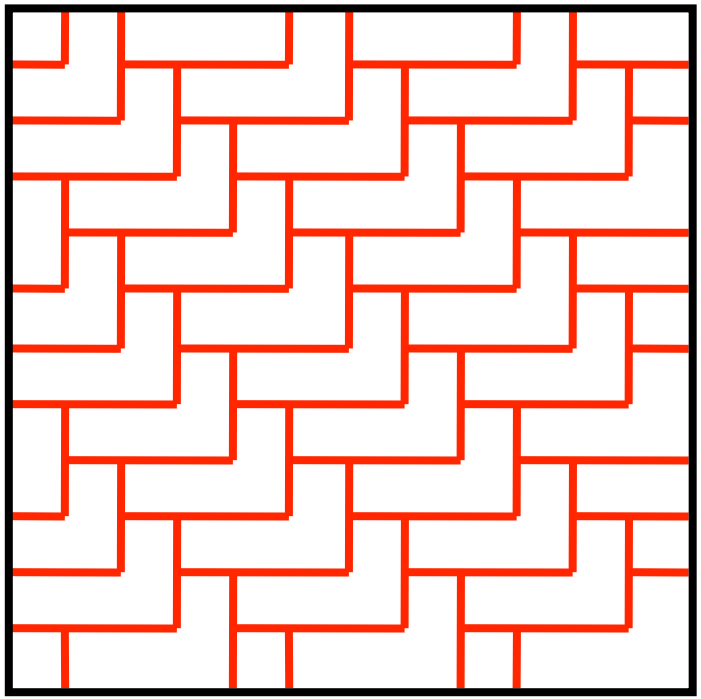
Antwort: 17

George Pólya

* 13. Dezember 1887
in Budapest

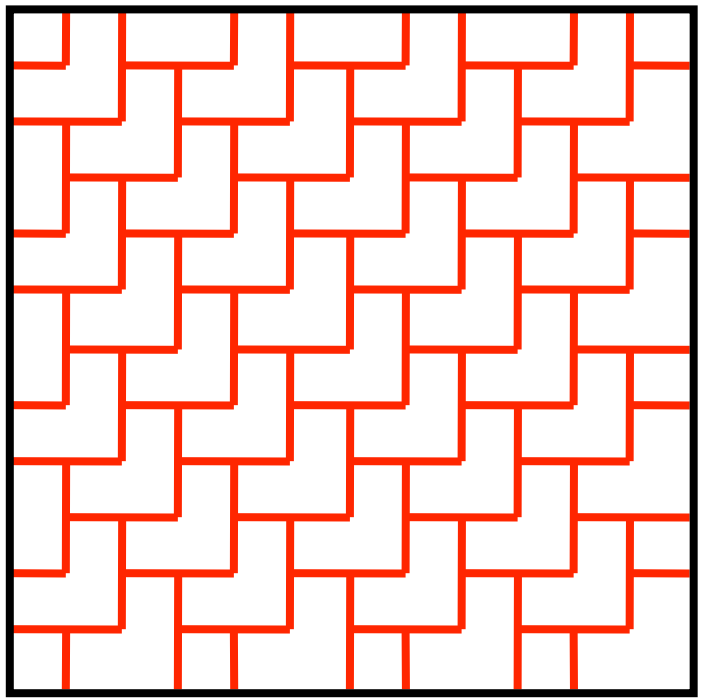
\+ 7 September 1985
in Palo Alto,
California, USA

Flächenornamente und Parkette



(1)

Flächenornamente und Parkette



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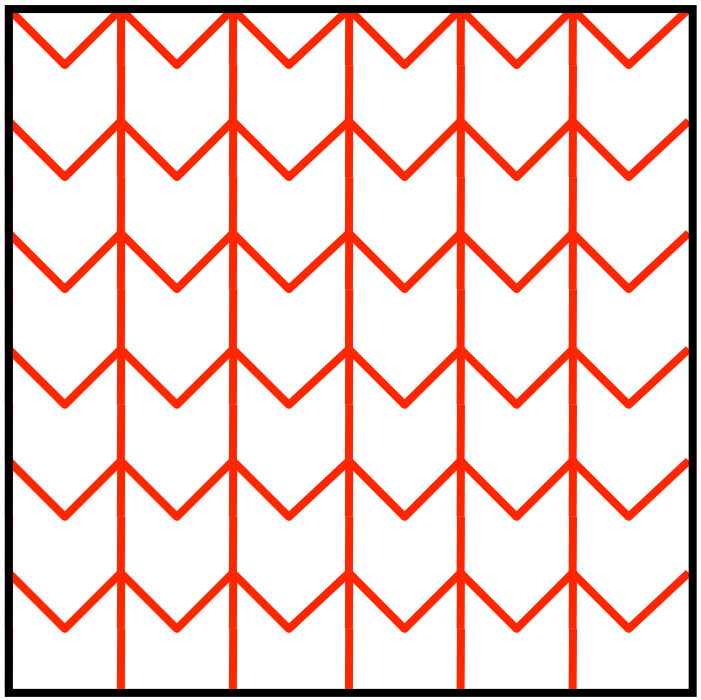
Flächenornamente und Parkette



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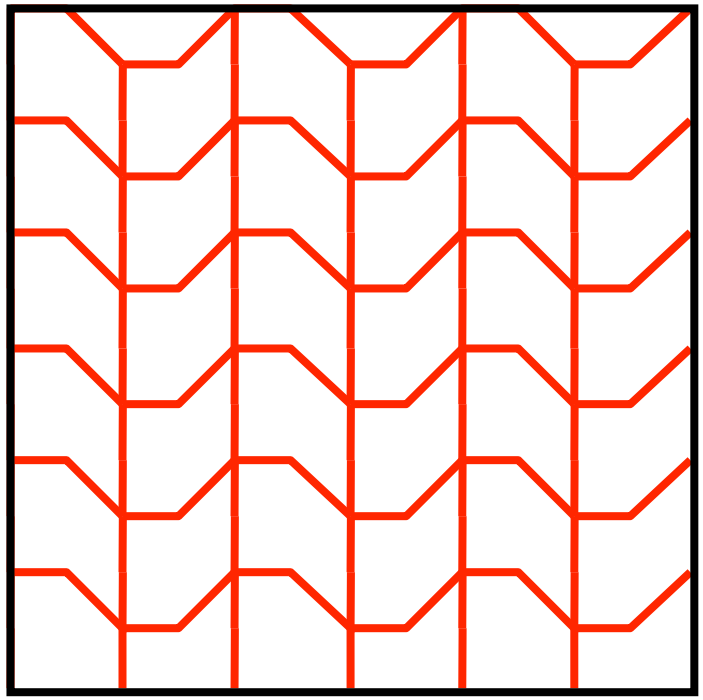
Flächenornamente und Parkette



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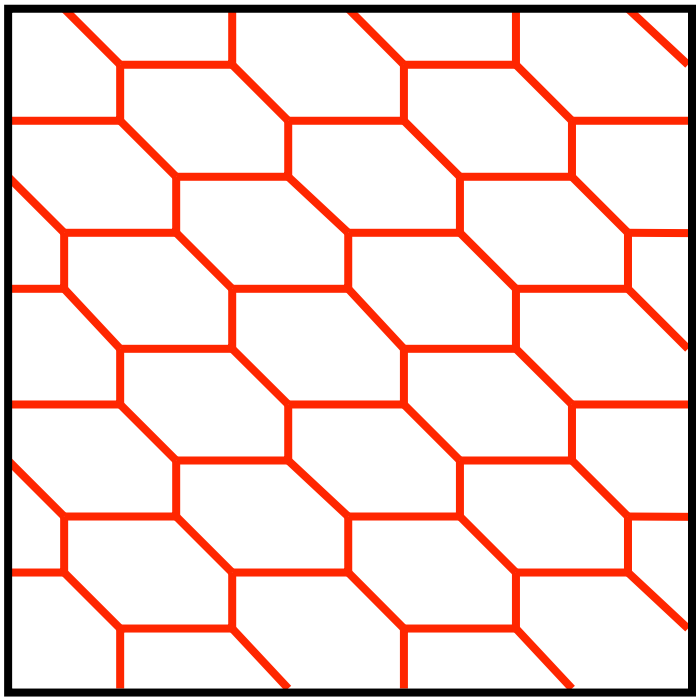
Flächenornamente und Parkette



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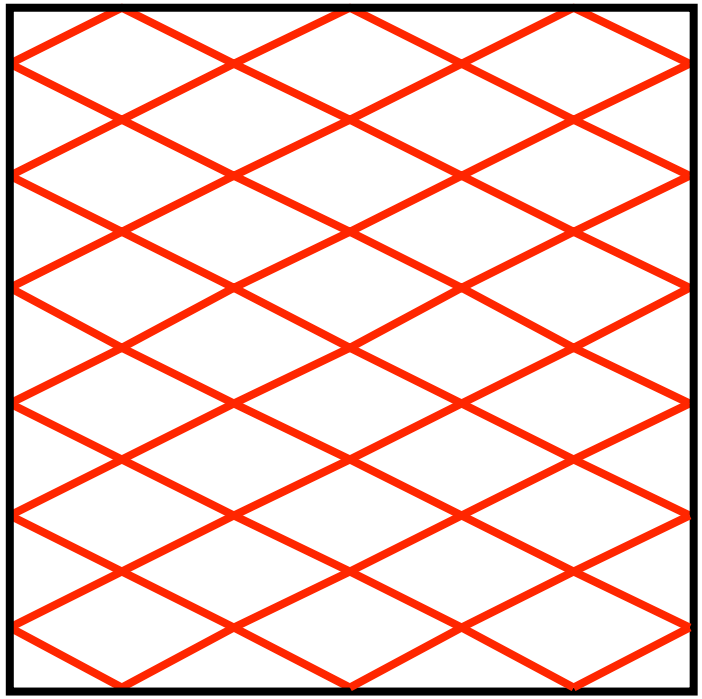
Flächenornamente und Parkette



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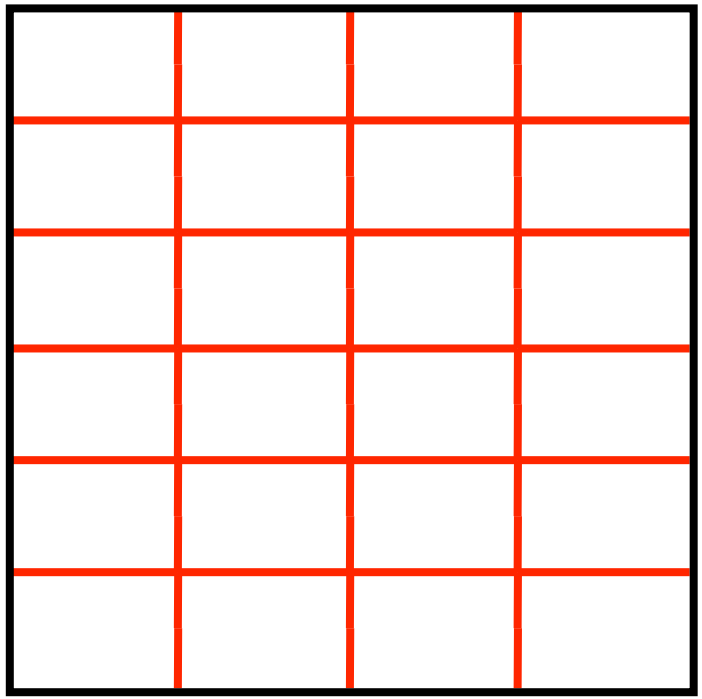
Flächenornamente und Parkette



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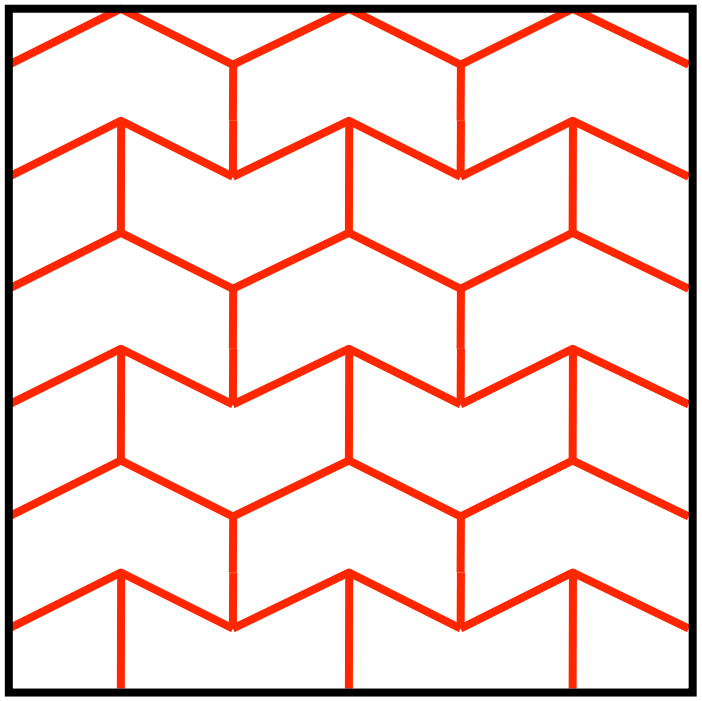
Flächenornamente und Parkette



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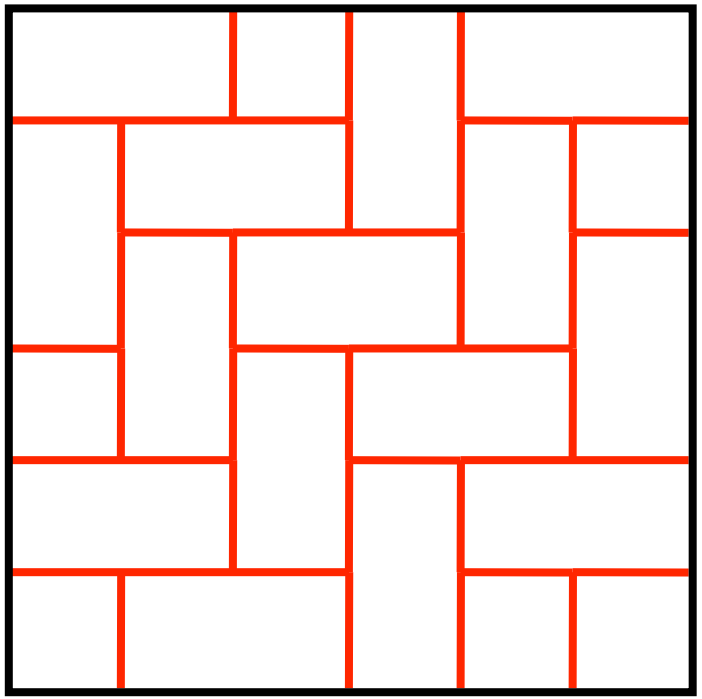
Flächenornamente und Parkette



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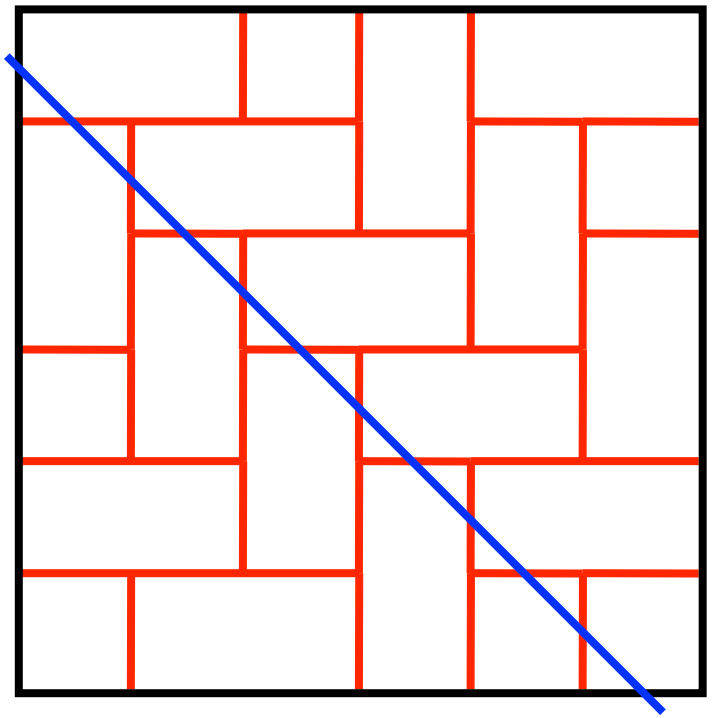
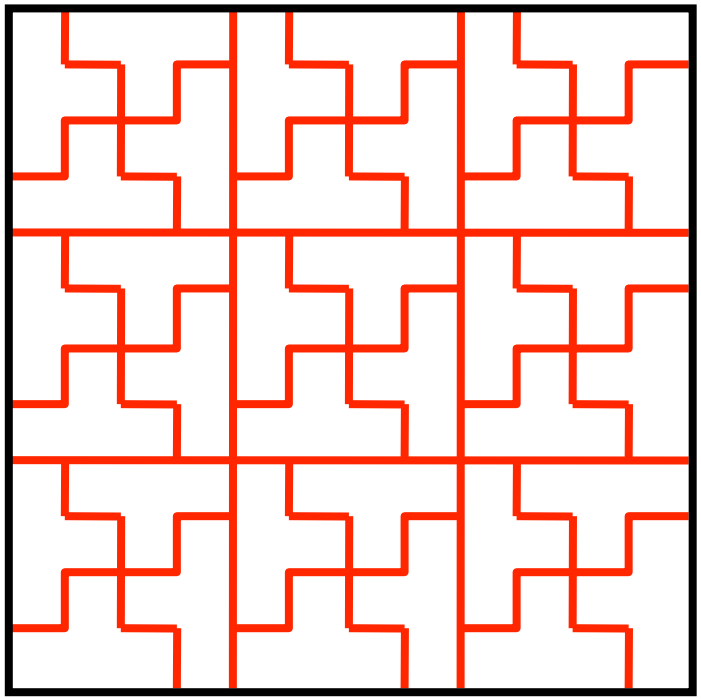
Flächenornamente und Parkette



(9)

Schubspiegelsymmetrie

Flächenornamente und Parkette



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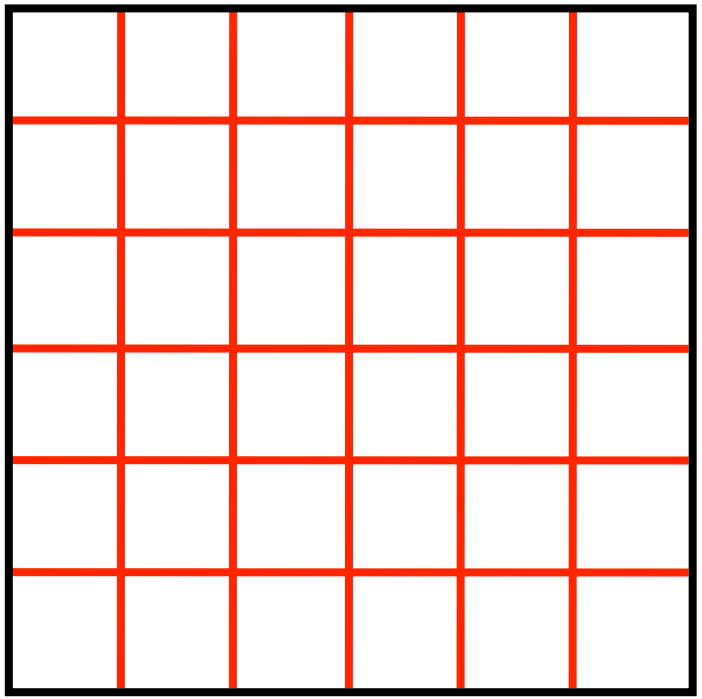
Flächenornamente und Parkette



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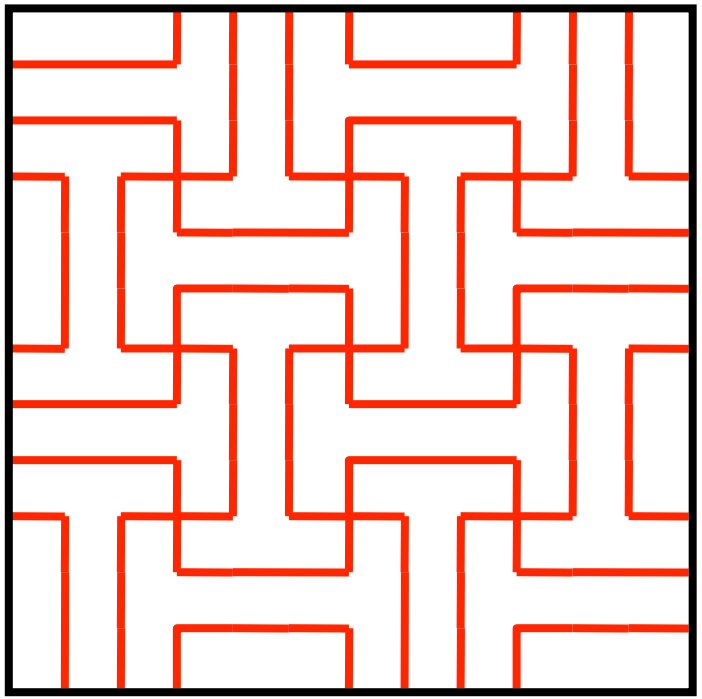
Flächenornamente und Parkette



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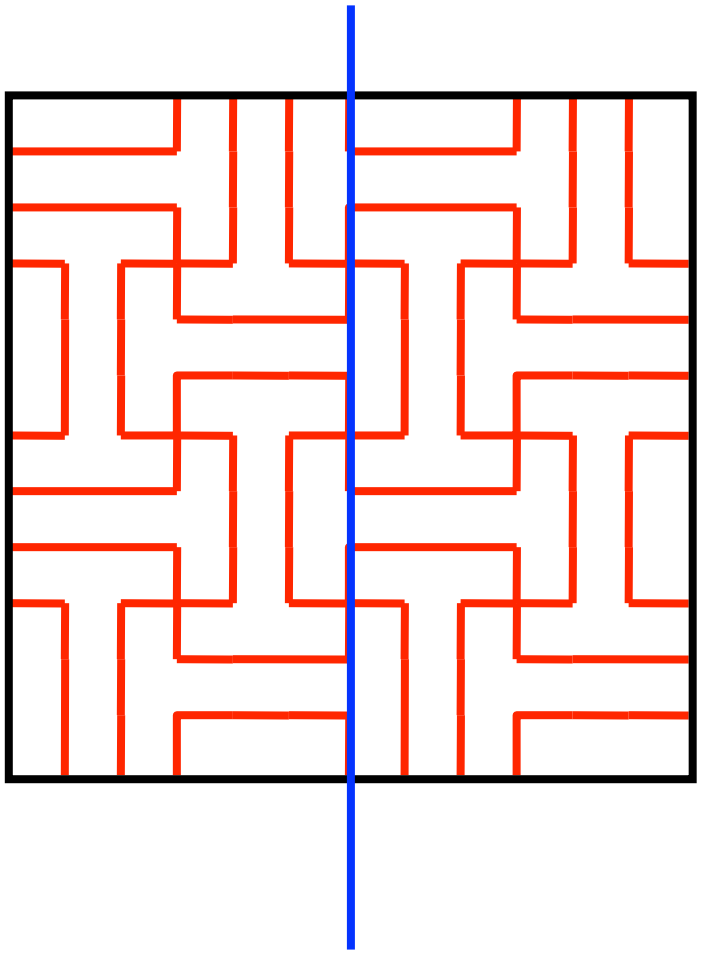
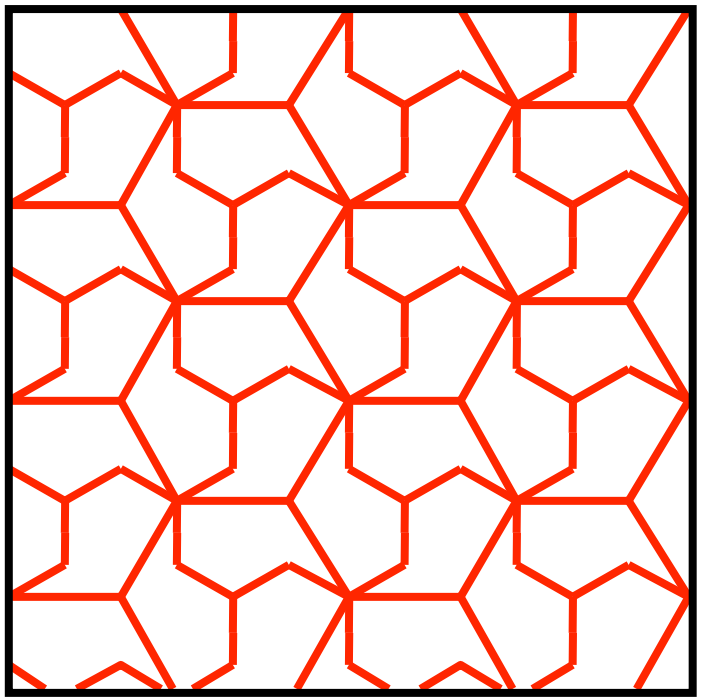
Flächenornamente und Parkette



(12)

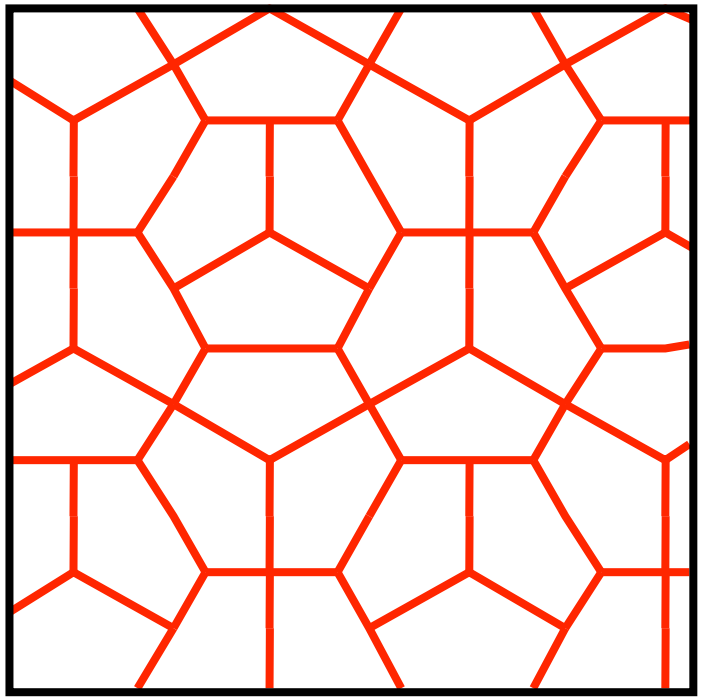
Schubspiegelachse

Flächenornamente und Parkette



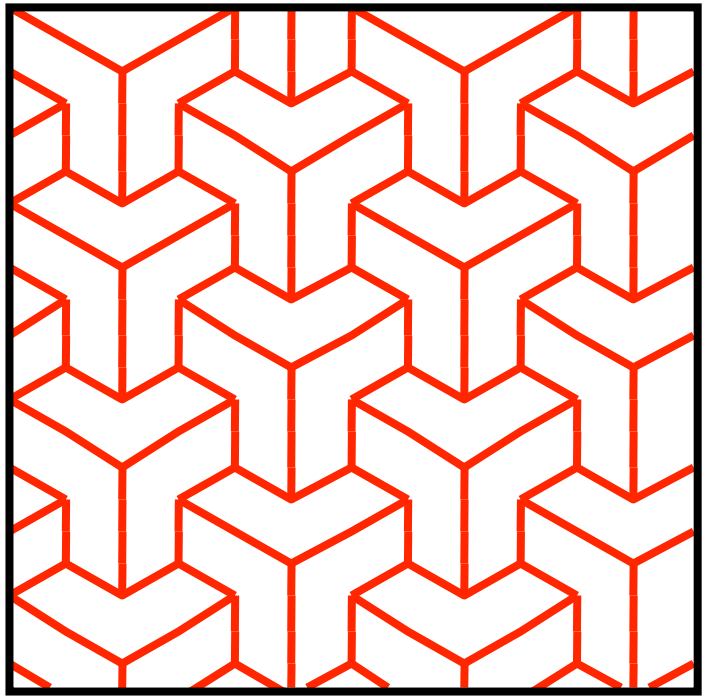
(13)

Flächenornamente und Parkette



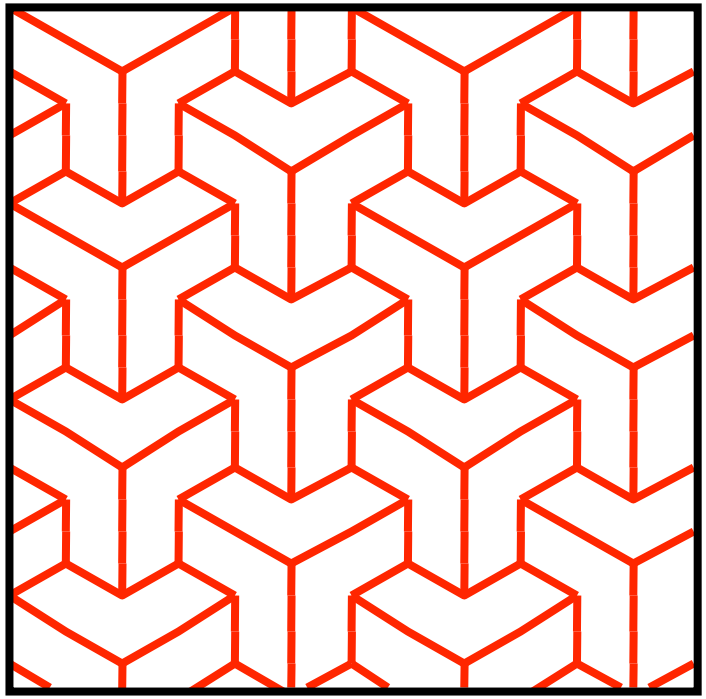
(14)

Flächenornamente und Parkette



(15)

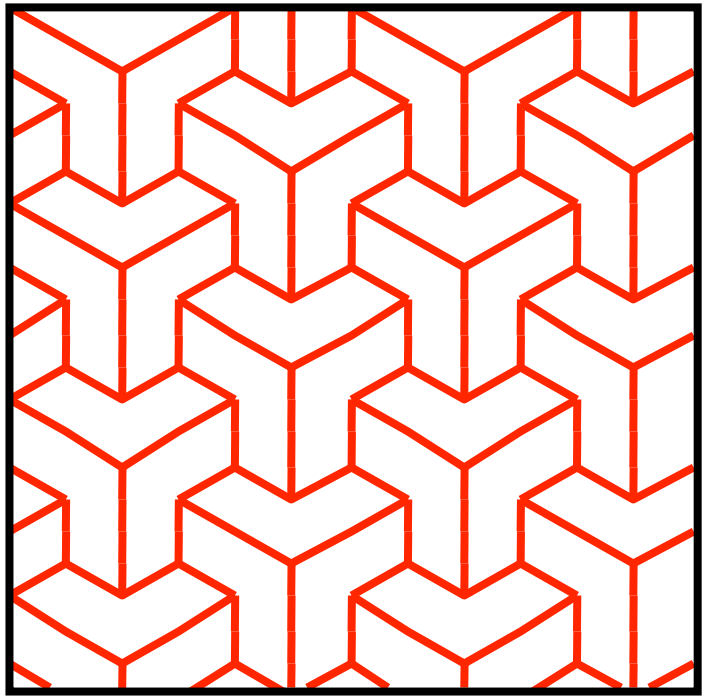
Flächenornamente und Parkette



(15)

Flächenornament oder

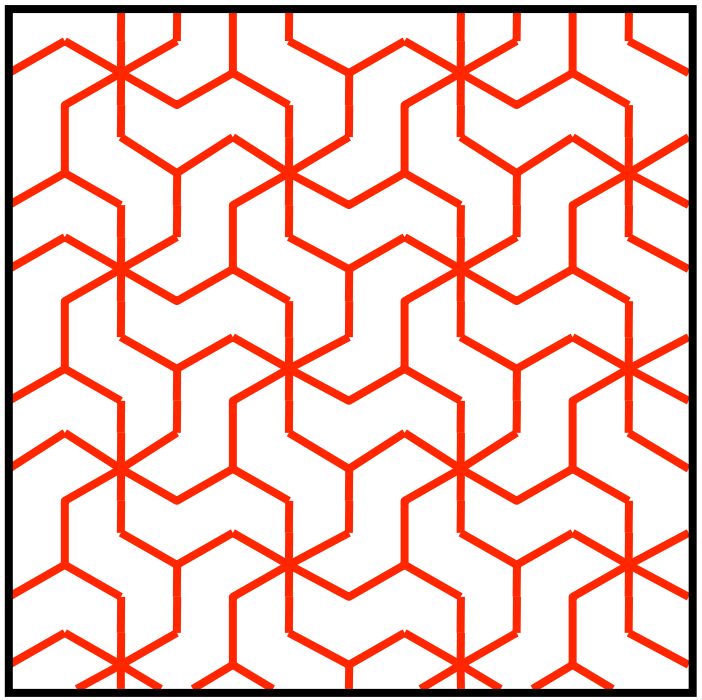
Flächenornamente und Parkette



(15)

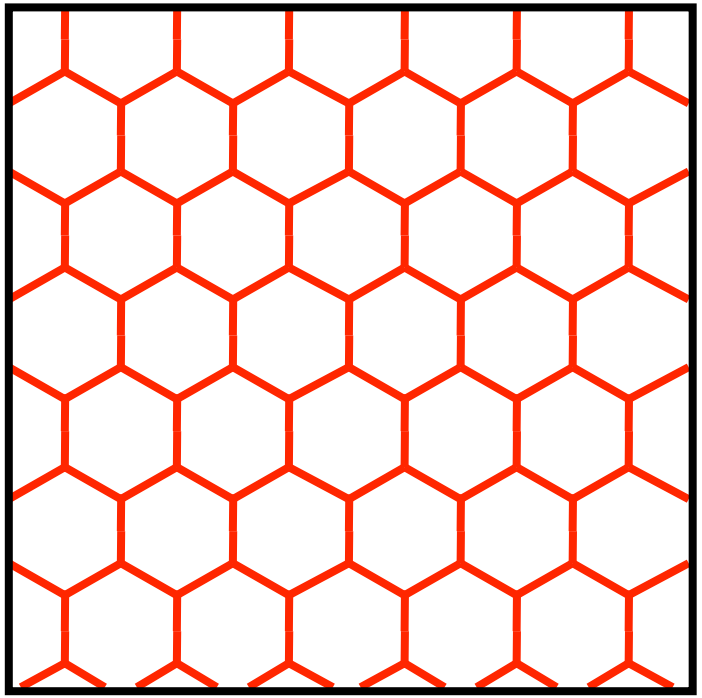
Flächenornament oder Würfelbeige?

Flächenornamente und Parkette

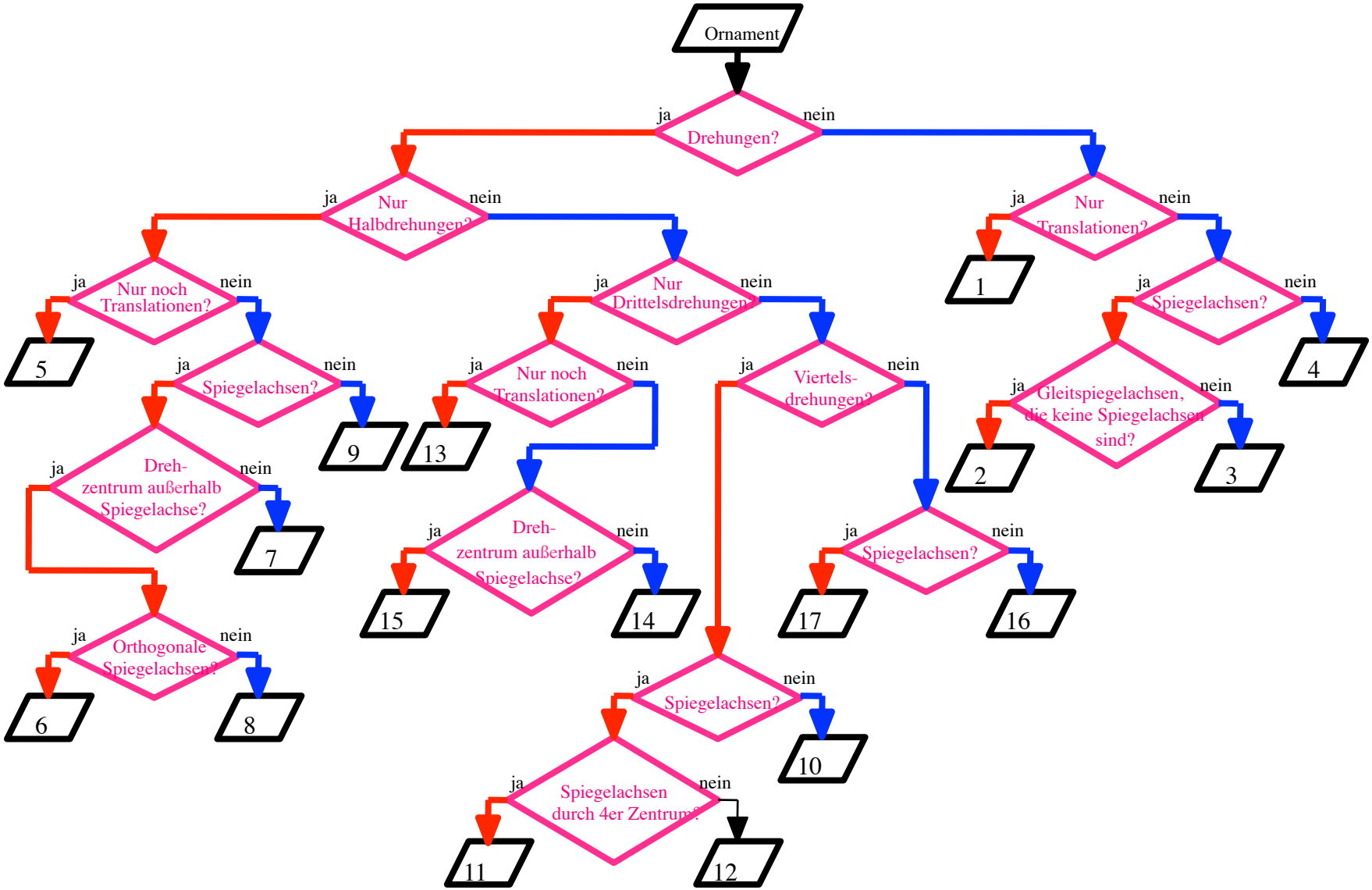


(16)

Flächenornamente und Parkette



(17)


Ornament
Drehungen?
ja
nein
Nur Halbdrehungen?
Nur Translationen?
Nur noch Translationen?
Nur Drittelsdrehungen?
Spiegelachsen?
Nur noch Translationen?
Viertels-drehungen?
Gleitspiegelachsen, die keine Spiegelachsen sind?
Dreh-zentrum außerhalb Spiegelachse?
Dreh-zentrum außerhalb Spiegelachse?
Spiegelachsen?
Orthogonale Spiegelachsen?
Spiegelachsen?
Spiegelachsen durch 4er Zentrum?
1
2
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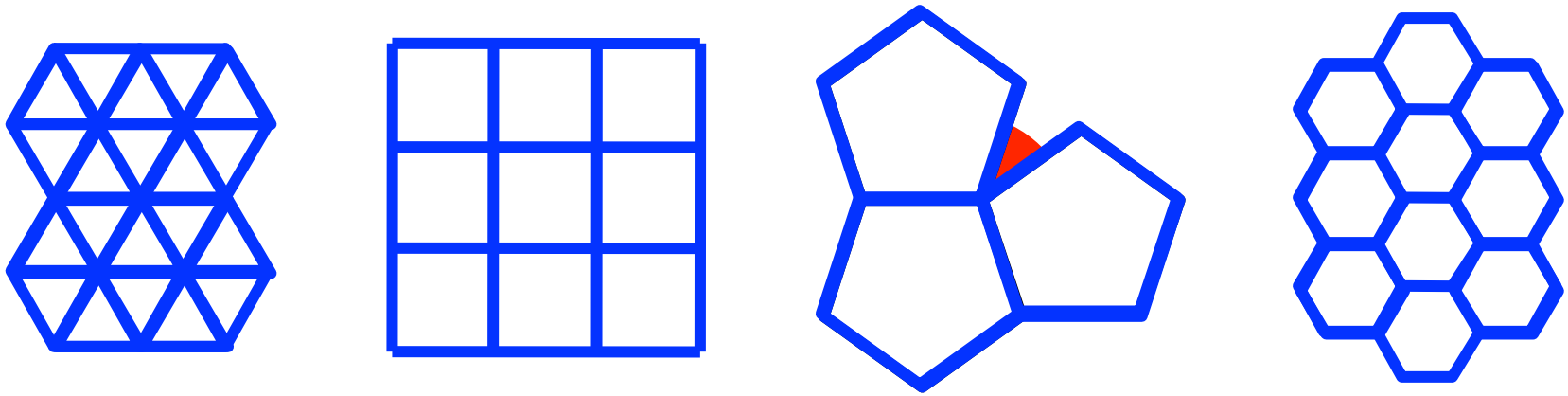

Beim Fünfeck
geht es nicht auf.