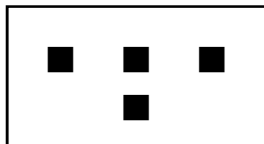


Die tetradisch-tetratomischen Zeichenklassen als zelluläre Automaten 2

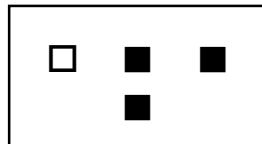
1. In Toth (2018) hatten wir die theoretischen Voraussetzungen besprochen, die nötig sind, um tetradisch-tetratomische Zeichenklassen in der Form ihrer Abbildungen auf Tetratomien in der Form von zellulären Automaten (ECA) darzustellen. Jedes dieser $4^4 = 256$ Quadrupel kann man nun, da sie paarweise verschieden sind, wie man leicht sieht, in der Form eines ECA notieren. Allerdings benötigt man dazu 4 Farbwerte und nicht nur schwarz und weiß, denn die 256 Quadrupel sind nicht mittels eines „Normalformoperators“ auf binäre Formen reduzierbar – wie das auch im Falle der 4-kontexturalen Tritozahlen der qualitativen Mathematik nicht möglich ist (vgl. Kaehr 2015). Wir setzen

$1 = \blacksquare$, $2 = \square$, $3 = \color{red}\blacksquare$, $4 = \color{blue}\blacksquare$.

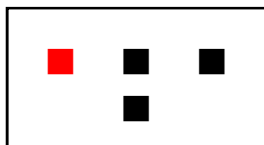
(1, 1, 1, 1)



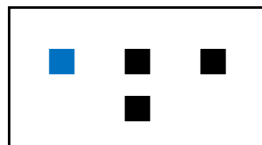
(2, 1, 1, 1)



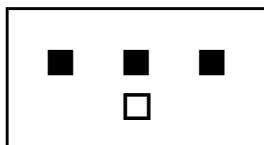
(3, 1, 1, 1)



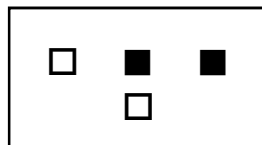
(4, 1, 1, 1)



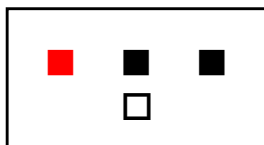
(1, 1, 1, 2)



(2, 1, 1, 2)



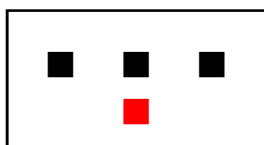
(3, 1, 1, 2)



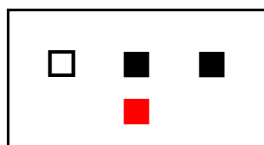
(4, 1, 1, 2)



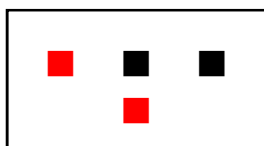
(1, 1, 1, 3)



(2, 1, 1, 3)



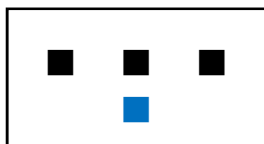
(3, 1, 1, 3)



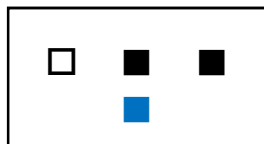
(4, 1, 1, 3)



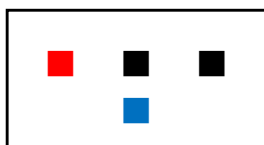
(1, 1, 1, 4)



(2, 1, 1, 4)



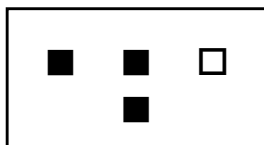
(3, 1, 1, 4)



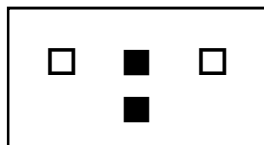
(4, 1, 1, 4)



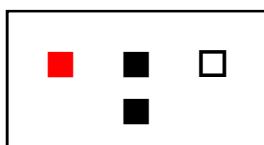
(1, 1, 2, 1)



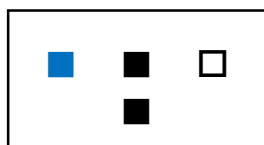
(2, 1, 2, 1)



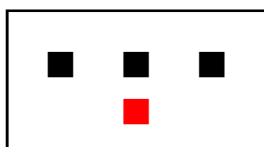
(3, 1, 2, 1)



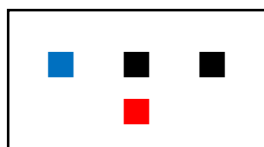
(4, 1, 2, 1)



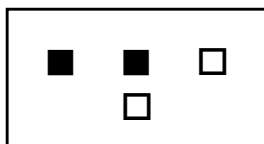
(1, 1, 2, 2)



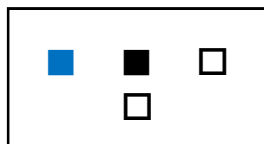
(2, 1, 2, 2)



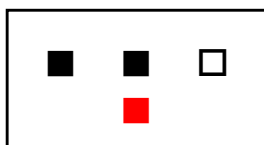
(3, 1, 2, 2)



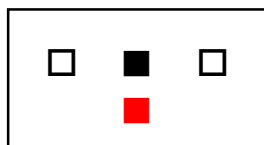
(4, 1, 2, 2)



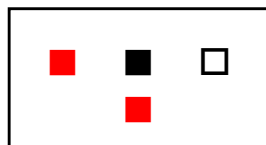
(1, 1, 2, 3)



(2, 1, 2, 3)



(3, 1, 2, 3)



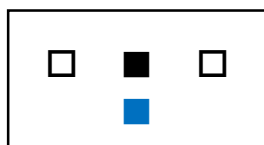
(4, 1, 2, 3)



(1, 1, 2, 4)



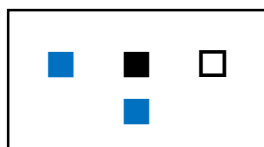
(2, 1, 2, 4)



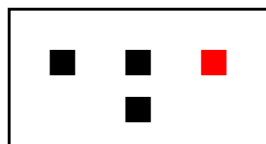
(3, 1, 2, 4)



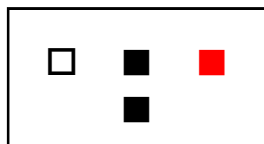
(4, 1, 2, 4)



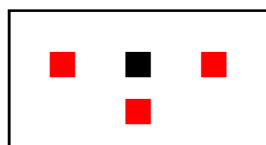
(1, 1, 3, 1)



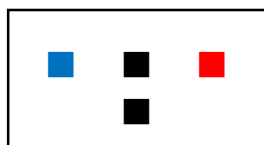
(2, 1, 3, 1)



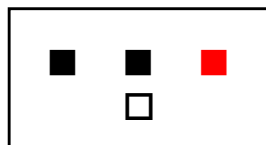
(3, 1, 3, 1)



(4, 1, 3, 1)



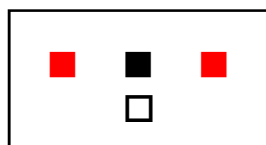
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(2, 1, 3, 2)



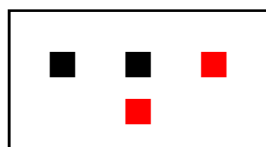
(3, 1, 3, 2)



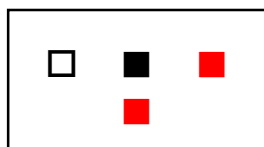
(4, 1, 3, 2)



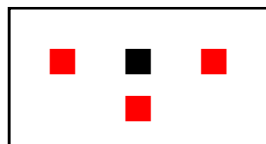
(1, 1, 3, 3)



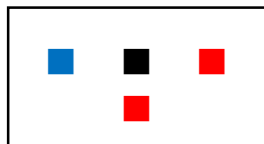
(2, 1, 3, 3)



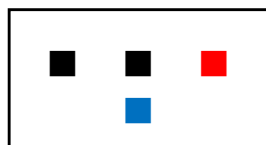
(3, 1, 3, 3)



(4, 1, 3, 3)



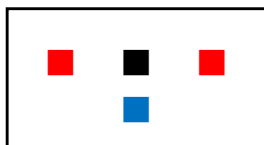
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(2, 1, 3, 4)



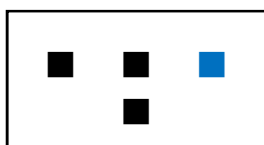
(3, 1, 3, 4)



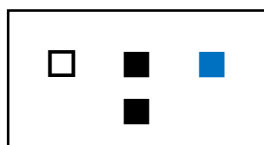
(4, 1, 3, 4)



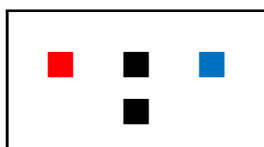
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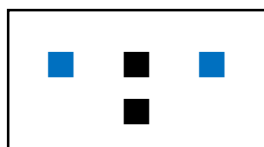
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(3, 1, 4, 1)



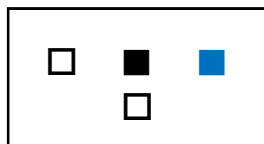
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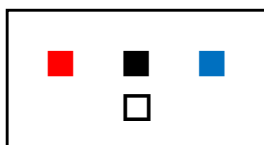
(1, 1, 4, 2)



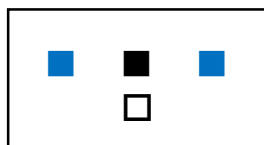
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(3, 1, 4, 2)



(4, 1, 4, 2)



(1, 1, 4, 3)



(2, 1, 4, 3)



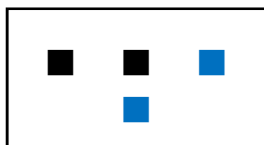
(3, 1, 4, 3)



(4, 1, 4, 3)



(1, 1, 4, 4)



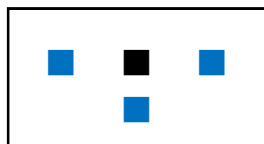
(2, 1, 4, 4)



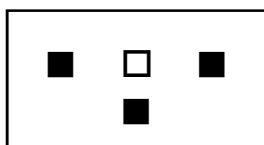
(3, 1, 4, 4)



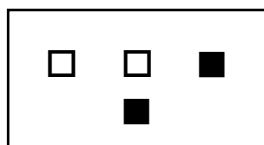
(4, 1, 4, 4)



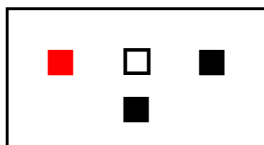
(1, 2, 1, 1)



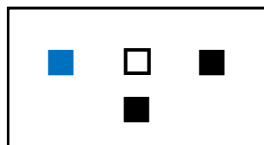
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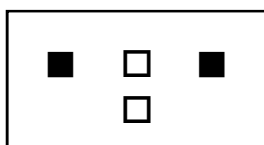
(3, 2, 1, 1)



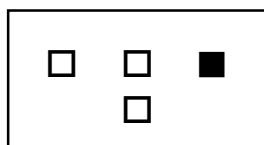
(4, 2, 1, 1)



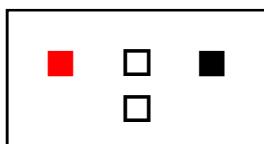
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(2, 2, 1, 2)



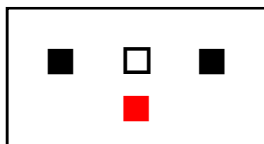
(3, 2, 1, 2)



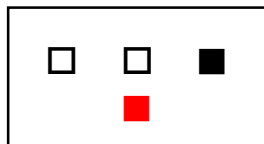
(4, 2, 1, 2)



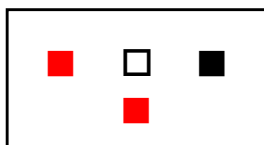
(1, 2, 1, 3)



(2, 2, 1, 3)



(3, 2, 1, 3)



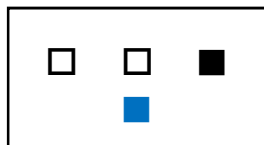
(4, 2, 1, 3)



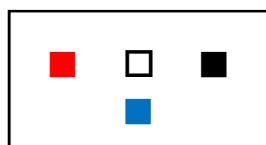
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(2, 2, 1, 4)



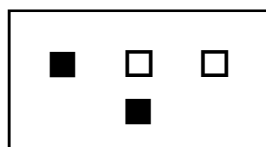
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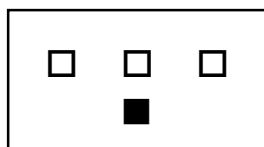
(4, 2, 1, 4)



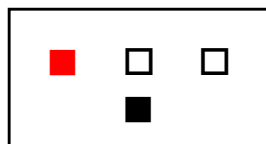
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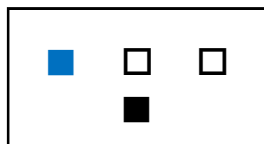
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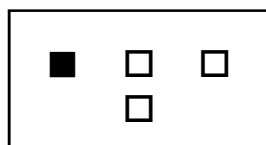
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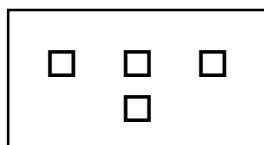
(4, 2, 2, 1)



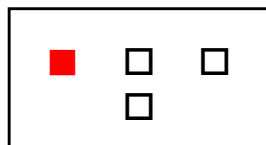
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(2, 2, 2, 2)



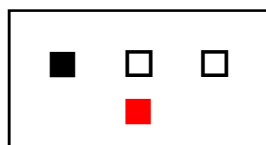
(3, 2, 2, 2)



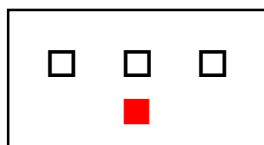
(4, 2, 2, 2)



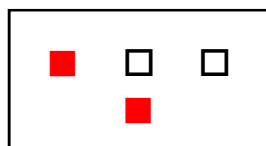
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(2, 2, 2, 3)



(3, 2, 2, 3)



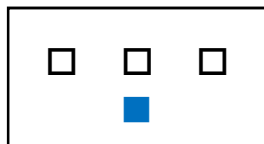
(4, 2, 2, 3)



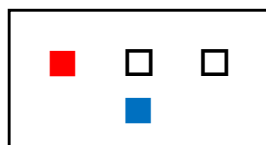
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(2, 2, 2, 4)



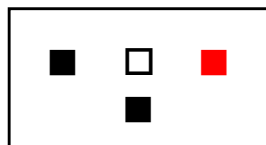
(3, 2, 2, 4)



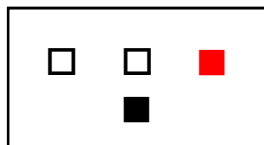
(4, 2, 2, 4)



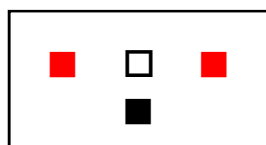
(1, 2, 3, 1)



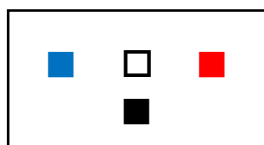
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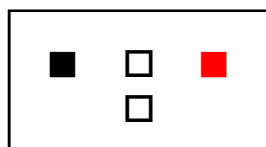
(3, 2, 3, 1)



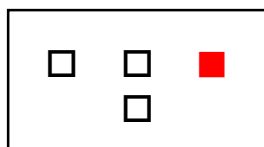
(4, 2, 3, 1)



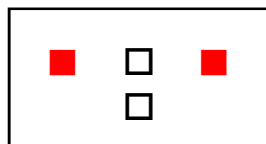
(1, 2, 3, 2)



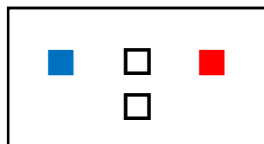
(2, 2, 3, 2)



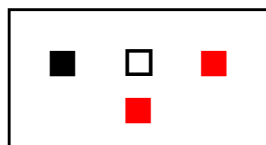
(3, 2, 3, 2)



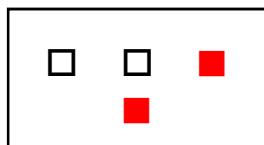
(4, 2, 3, 2)



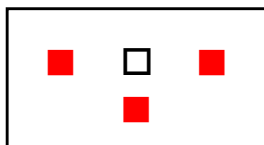
(1, 2, 3, 3)



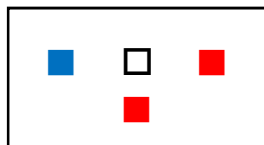
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(3, 2, 3, 3)



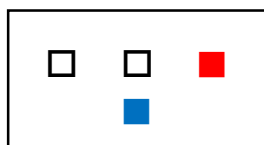
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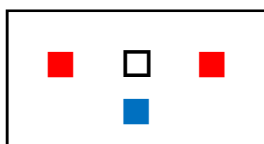
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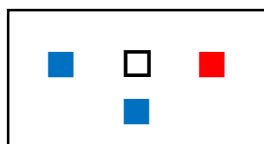
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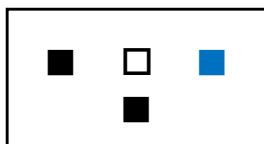
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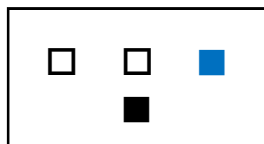
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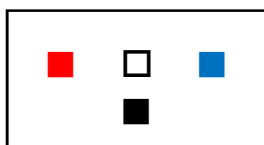
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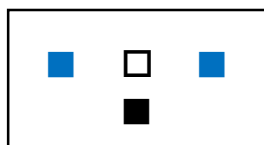
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(3, 2, 4, 1)



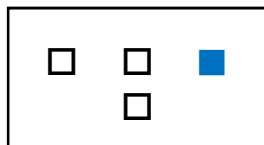
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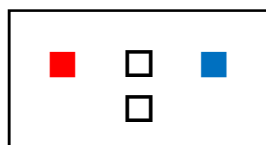
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(2, 2, 4, 2)



(3, 2, 4, 2)



(4, 2, 4, 2)



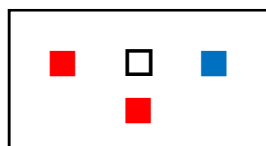
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(2, 2, 4, 3)



(3, 2, 4, 3)



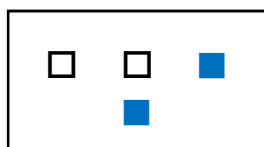
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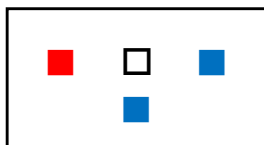
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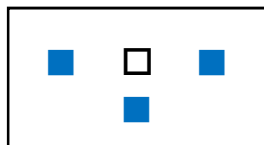
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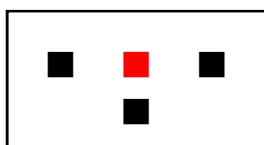
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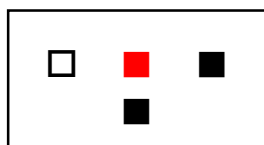
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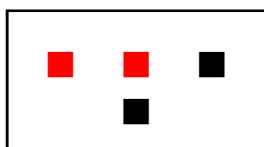
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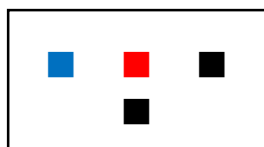
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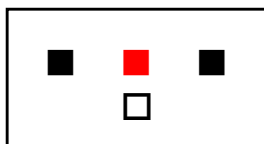
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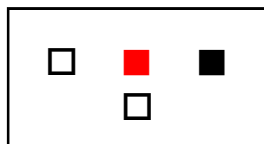
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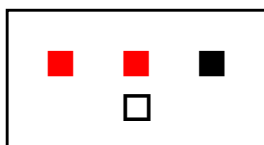
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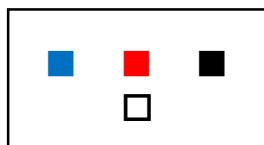
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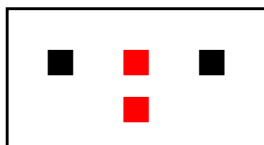
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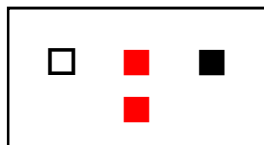
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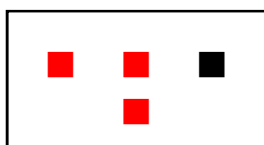
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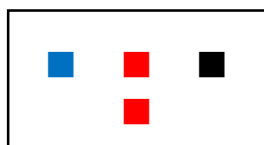
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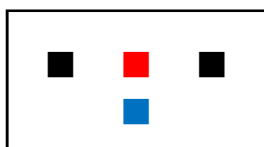
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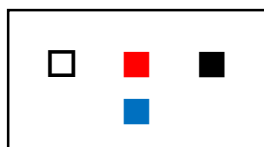
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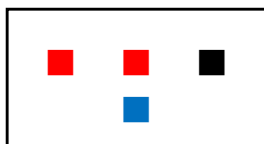
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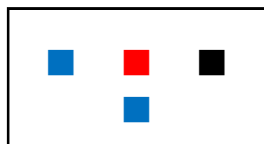
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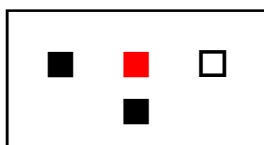
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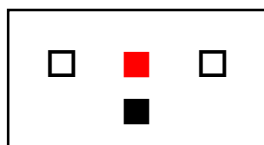
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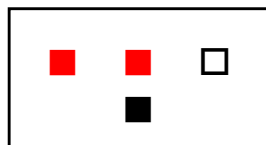
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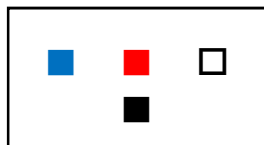
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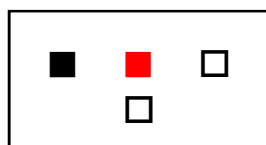
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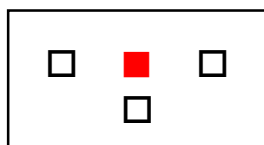
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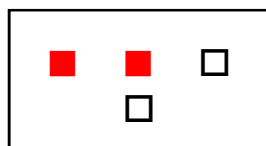
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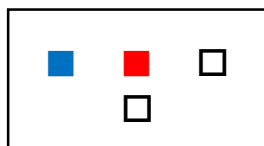
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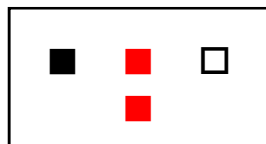
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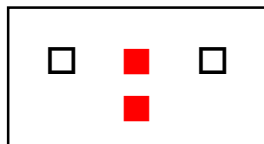
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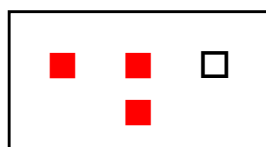
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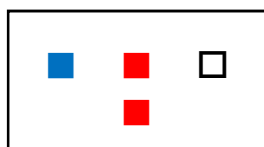
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(3, 3, 2, 3)



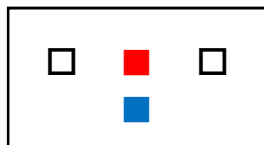
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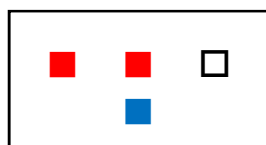
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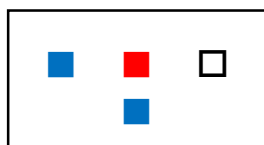
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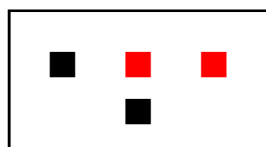
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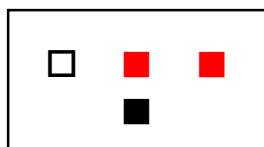
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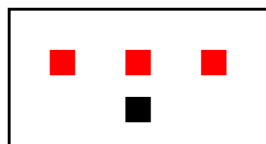
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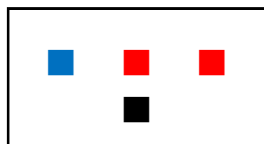
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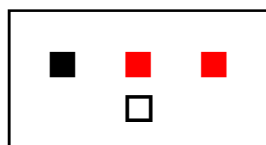
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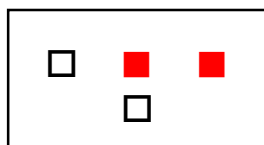
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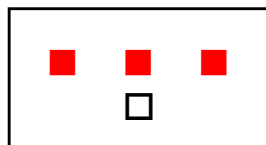
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(2, 3, 3, 2)



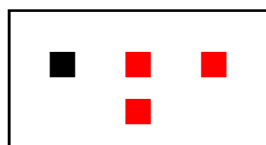
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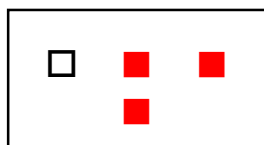
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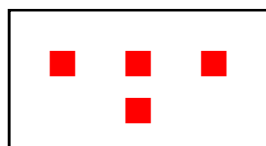
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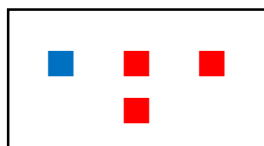
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(3, 3, 3, 3)



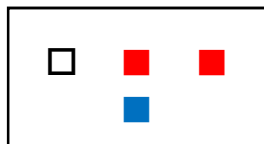
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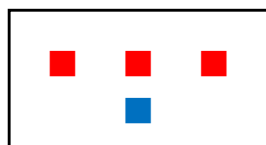
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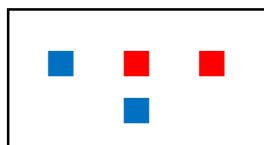
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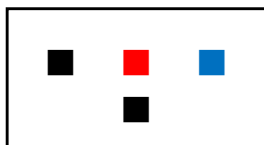
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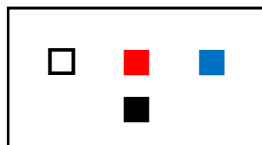
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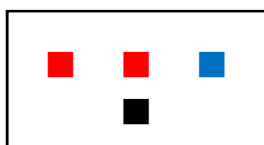
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(2, 3, 4, 1)



(3, 3, 4, 1)



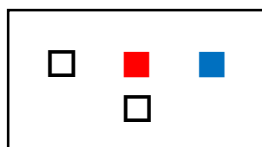
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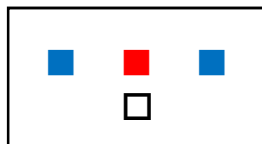
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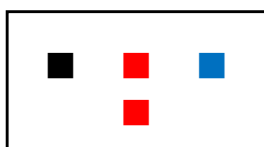
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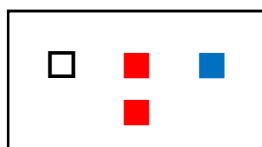
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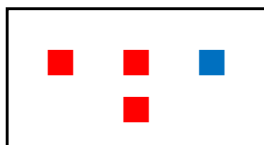
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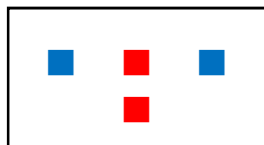
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(3, 3, 4, 3)



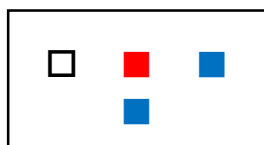
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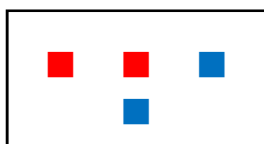
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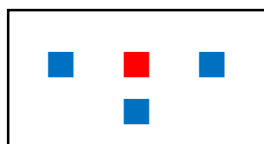
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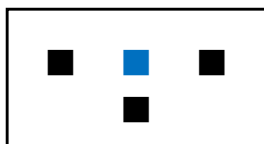
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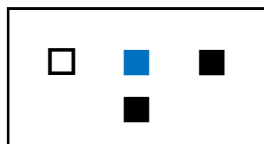
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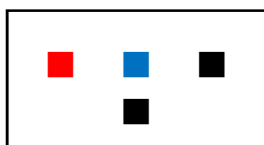
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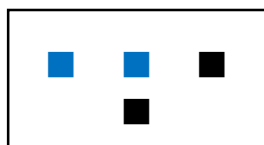
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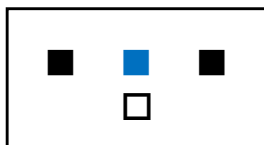
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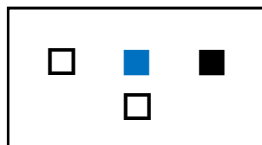
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(1, 4, 1, 2)



(2, 4, 1, 2)



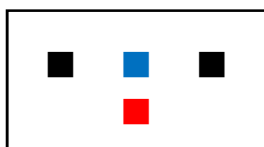
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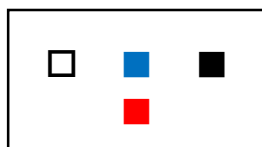
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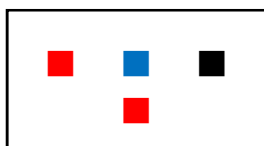
(1, 4, 1, 3)



(2, 4, 1, 3)



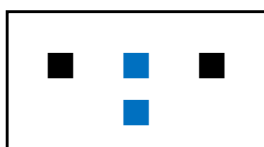
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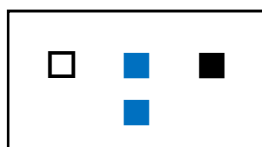
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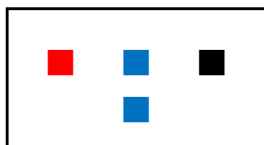
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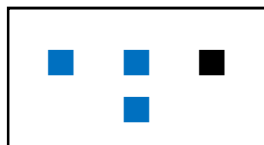
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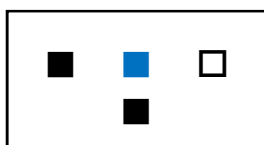
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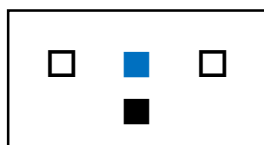
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(1, 4, 2, 1)



(2, 4, 2, 1)



(3, 4, 2, 1)



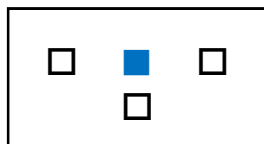
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(2, 4, 2, 2)



(3, 4, 2, 2)



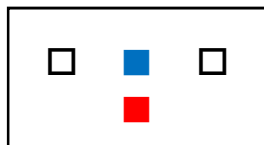
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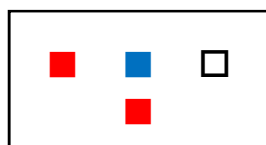
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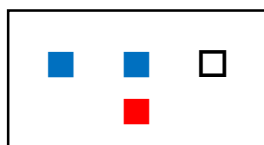
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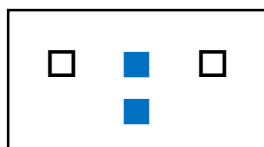
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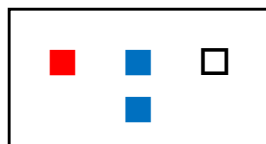
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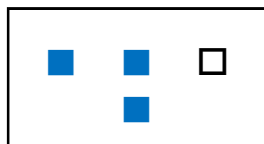
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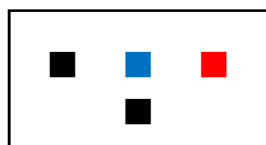
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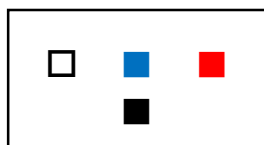
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(1, 4, 3, 1)



(2, 4, 3, 1)



(3, 4, 3, 1)



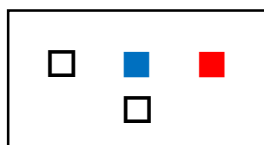
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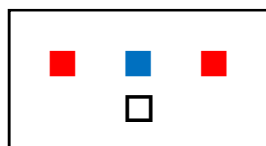
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(2, 4, 3, 2)



(3, 4, 3, 2)



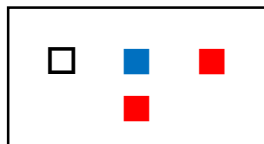
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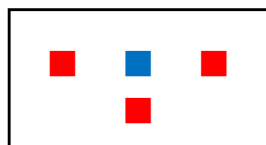
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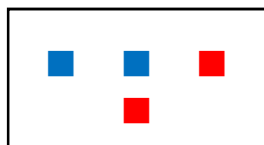
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(3, 4, 3, 3)



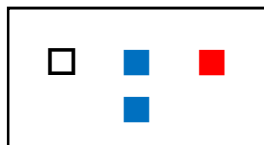
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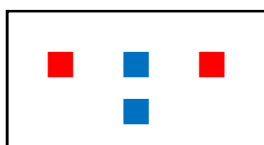
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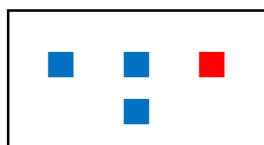
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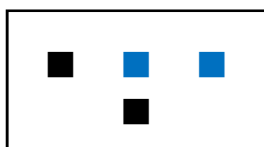
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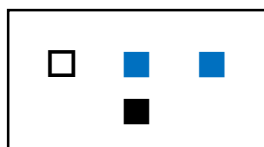
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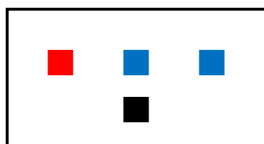
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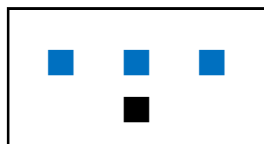
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(3, 4, 4, 1)



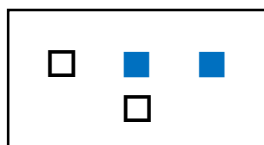
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(1, 4, 4, 2)



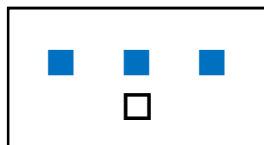
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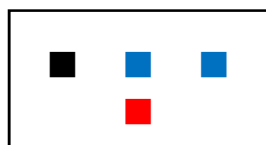
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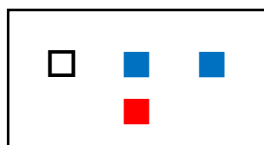
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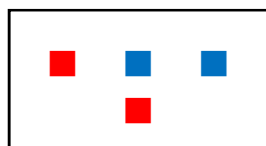
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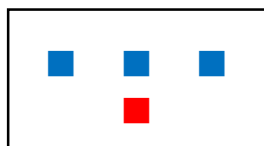
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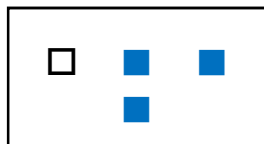
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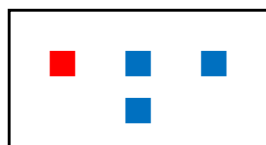
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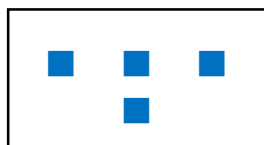
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(3, 4, 4, 4)



(4, 4, 4, 4)



Literatur

Kaehr, Rudolf, Metaphors of Dissemination and Interaction of morphoCAs. In: ThinkArt Lab (Glasgow), Oct. 2015

Toth, Alfred, Die tetradisch-tetratomischen Zeichenklassen als zelluläre Automaten 1. In: Electronic Journal for Mathematical Semiotics, 2018

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