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Rudolf Kaehr
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Title
Palindromes: Calculation Materials
Tables of morphic palindromes

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2013

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Abstract
Theoretical text at:
Morphosphere(s): Asymmetric Palindromes as Keys (3_22)

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K06 Diamond Strategies	K13 RK and friends
K07 Contextual Programming Paradigm	

Palindromes: Calculation Materials

Tables of morphic palindromes

Rudolf Kaehr Dr.[@]

Abstract

Calculations

System
SML/NJ: http://www.smlnj.org/,
Morphogrammatics
http://www.thinkartlab.com/pkl/SML-sources.NJ/ALL-MG-nov2012.sml
Book Morphogrammatik
http://www.thinkartlab.com/pkl/media/mg-book.pdf

ML approach to palindromes
fun kref ks = tnf(rev ks);
fun ispalindrome l = (l = kref l);
val ispalindrome = fn : int list -> bool
fun palindrome l = (l = rev l);
fun dref ks = dnf(rev ks);
fun dnfispalindrome l = (l = dref l);

Theoretical text at:

http://memristors.memristics.com/Morphospheres/Asymmetric%20Palindromes.html
http://memristors.memristics.com/Morphospheres/Asymmetric%20Palindromes.pdf

(Work in progress v. 0.3.6, Jan. 2013)

1. Kenogrammatic operations

[1] - **List.filter ispalindrome** "kconcat [1,2,3,1,4,5,2,4] [1,2,3,1,4,5,2,4]":
val it =
  [[1,2,3,1,4,5,2,4,1,2,3,1,4,5,2,4],[1,2,3,1,4,5,2,4,1,2,5,1,4,3,2,4],
  [1,2,3,1,4,5,2,4,1,3,5,1,4,2,3,4],[1,2,3,1,4,5,2,4,1,5,2,1,4,3,5,4],
  [1,2,3,1,4,5,2,4,2,4,1,2,5,3,4,5],[1,2,3,1,4,5,2,4,2,4,3,2,1,5,4,1],
  [1,2,3,1,4,5,2,4,2,4,5,2,1,3,4,1],[1,2,3,1,4,5,2,4,2,4,5,2,3,1,4,3],
  [1,2,3,1,4,5,2,4,3,1,5,3,2,4,1,2],[1,2,3,1,4,5,2,4,3,2,1,3,5,4,2,5],
  [1,2,3,1,4,5,2,4,3,2,5,3,1,4,2,1],[1,2,3,1,4,5,2,4,3,5,2,3,1,4,5,1],
  [1,2,3,1,4,5,2,4,4,1,3,4,2,5,1,2],[1,2,3,1,4,5,2,4,4,1,5,4,2,3,1,2],
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  [1,2,3,1,4,5,2,4,4,2,5,4,1,3,2,1],[1,2,3,1,4,5,2,4,4,2,5,4,3,1,2,3],
  [1,2,3,1,4,5,2,4,4,3,1,4,5,2,3,5],[1,2,3,1,4,5,2,4,4,3,5,4,1,2,3,1],
  [1,2,3,1,4,5,2,4,4,5,2,4,1,3,5,1],[1,2,3,1,4,5,2,4,4,5,2,4,3,1,5,3],
  [1,2,3,1,4,5,2,4,5,1,4,5,2,3,1,2],[1,2,3,1,4,5,2,4,5,2,4,5,1,3,2,1],

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[1,2,3,1,4,5,2,4,1,2,6,1,4,3,2,4],[1,2,3,1,4,5,2,4,1,3,6,1,4,2,3,4],
[1,2,3,1,4,5,2,4,2,4,6,2,1,3,4,1],[1,2,3,1,4,5,2,4,2,4,6,2,3,1,4,3],
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[1,2,3,1,4,5,2,4,6,7,8,6,1,3,7,1],[1,2,3,1,4,5,2,4,6,7,8,6,3,1,7,3],
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[1,2,3,1,4,5,2,4,4,5,2,4,6,3,5,6],[1,2,3,1,4,5,2,4,5,2,4,5,6,3,2,6],
[1,2,3,1,4,5,2,4,5,3,4,5,6,2,3,6],[1,2,3,1,4,5,2,4,2,4,6,2,7,3,4,7],
[1,2,3,1,4,5,2,4,3,2,6,3,7,4,2,7],[1,2,3,1,4,5,2,4,4,2,6,4,7,3,2,7],
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[1,2,3,1,4,5,2,4,6,2,5,6,7,3,2,7],[1,2,3,1,4,5,2,4,6,3,5,6,7,2,3,7],
[1,2,3,1,4,5,2,4,6,5,2,6,7,3,5,7],[1,2,3,1,4,5,2,4,6,2,7,6,8,3,2,8],
[1,2,3,1,4,5,2,4,6,3,7,6,8,2,3,8],[1,2,3,1,4,5,2,4,2,4,5,2,6,7,4,6],
[1,2,3,1,4,5,2,4,4,2,5,4,6,7,2,6],[1,2,3,1,4,5,2,4,4,5,2,4,6,7,5,6],
[1,2,3,1,4,5,2,4,5,2,4,5,6,7,2,6],[1,2,3,1,4,5,2,4,2,4,6,2,7,8,4,7],
[1,2,3,1,4,5,2,4,4,2,6,4,7,8,2,7],[1,2,3,1,4,5,2,4,6,2,5,6,7,8,2,7],
[1,2,3,1,4,5,2,4,6,5,2,6,7,8,5,7],[1,2,3,1,4,5,2,4,6,2,7,6,8,9,2,8],
[1,2,3,1,4,5,2,4,3,6,5,3,7,4,6,7],[1,2,3,1,4,5,2,4,4,6,3,4,7,5,6,7],
[1,2,3,1,4,5,2,4,4,6,5,4,7,3,6,7],[1,2,3,1,4,5,2,4,5,6,4,5,7,3,6,7],
[1,2,3,1,4,5,2,4,3,6,7,3,8,4,6,8],[1,2,3,1,4,5,2,4,4,6,7,4,8,3,6,8],
[1,2,3,1,4,5,2,4,6,7,3,6,8,5,7,8],[1,2,3,1,4,5,2,4,6,7,5,6,8,3,7,8],

[1,2,3,1,4,5,2,4,6,7,8,6,9,3,7,9]],[1,2,3,1,4,5,2,4,4,6,5,4,7,8,6,7],
[1,2,3,1,4,5,2,4,5,6,4,5,7,8,6,7],[1,2,3,1,4,5,2,4,4,6,7,4,8,9,6,8],
[1,2,3,1,4,5,2,4,6,7,5,6,8,9,7,8],[1,2,3,1,4,5,2,4,6,7,8,6,9,10,7,9]]
: int list list
- length it;
val it = 142 : int-

kconcat [1,2,3,1,3,1,4,3] [1,2,3,1,4,5,2,4];
val it =
  [[1,2,3,1,3,1,4,3,1,2,3,1,4,5,2,4],[1,2,3,1,3,1,4,3,1,2,3,1,5,4,2,5],
  [1,2,3,1,3,1,4,3,1,2,4,1,3,5,2,3],[1,2,3,1,3,1,4,3,1,2,4,1,5,3,2,5],
  [1,2,3,1,3,1,4,3,1,2,5,1,3,4,2,3],[1,2,3,1,3,1,4,3,1,2,5,1,4,3,2,4],
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  [1,2,3,1,3,1,4,3,1,3,5,1,2,4,3,2],[1,2,3,1,3,1,4,3,1,3,5,1,4,2,3,4],
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  [1,2,3,1,3,1,4,3,1,4,3,1,2,5,4,2],[1,2,3,1,3,1,4,3,1,4,3,1,5,2,4,5],
  [1,2,3,1,3,1,4,3,1,4,5,1,2,3,4,2],[1,2,3,1,3,1,4,3,1,4,5,1,3,2,4,3],
  [1,2,3,1,3,1,4,3,1,5,2,1,3,4,5,3],[1,2,3,1,3,1,4,3,1,5,2,1,4,3,5,4],
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  [1,2,3,1,3,1,4,3,2,1,4,2,3,5,1,3],[1,2,3,1,3,1,4,3,2,1,4,2,5,3,1,5],
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  [1,2,3,1,3,1,4,3,2,3,4,2,1,5,3,1],[1,2,3,1,3,1,4,3,2,3,4,2,5,1,3,5],
  [1,2,3,1,3,1,4,3,2,3,5,2,1,4,3,1],[1,2,3,1,3,1,4,3,2,3,5,2,4,1,3,4],
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- kconcat[1,2,2,1,3,4,4,3] [1,2,2,1,3,4,4,3]
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val it = 209 : int

ispalindrome: 43
val it =
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val it =
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      [1,2,1,3,4,3,2,1,2,3,4,3,1,2,1,5,6,5,7,2,7,8,5,8,7,2,7,5,6,5],
      [1,2,1,3,4,3,2,1,2,3,4,3,1,2,1,5,6,5,7,8,7,2,5,2,7,8,7,5,6,5],
      [1,2,1,3,4,3,2,1,2,3,4,3,1,2,1,3,4,3,5,6,5,7,3,7,5,6,5,3,4,3],
      [1,2,1,3,4,3,2,1,2,3,4,3,1,2,1,3,5,3,4,6,4,7,3,7,4,6,4,3,5,3],
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      [1,2,1,3,4,3,2,1,2,3,4,3,1,2,1,3,5,3,6,7,6,4,3,4,6,7,6,3,5,3],
      [1,2,1,3,4,3,2,1,2,3,4,3,1,2,1,4,3,4,5,6,5,7,4,7,5,6,5,4,3,4],
      [1,2,1,3,4,3,2,1,2,3,4,3,1,2,1,4,5,4,3,6,3,7,4,7,3,6,3,4,5,4],
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      [1,2,1,3,4,3,2,1,2,3,4,3,1,2,1,5,6,5,7,3,7,8,5,8,7,3,7,5,6,5],
      [1,2,1,3,4,3,2,1,2,3,4,3,1,2,1,5,6,5,7,8,7,3,5,3,7,8,7,5,6,5],
      [1,2,1,3,4,3,2,1,2,3,4,3,1,2,1,4,5,4,6,7,6,8,4,8,6,7,6,4,5,4],
      [1,2,1,3,4,3,2,1,2,3,4,3,1,2,1,5,4,5,6,7,6,8,5,8,6,7,6,5,4,5],
      [1,2,1,3,4,3,2,1,2,3,4,3,1,2,1,5,6,5,4,7,4,8,5,8,4,7,4,5,6,5],
      [1,2,1,3,4,3,2,1,2,3,4,3,1,2,1,5,6,5,7,4,7,8,5,8,7,4,7,5,6,5],
      [1,2,1,3,4,3,2,1,2,3,4,3,1,2,1,5,6,5,7,8,7,4,5,4,7,8,7,5,6,5],
      [1,2,1,3,4,3,2,1,2,3,4,3,1,2,1,5,6,5,7,8,7,9,5,9,7,8,7,5,6,5]]
   : int list list
- length it;
val it = 501 : int


- kmul[1,2,1][1,2,3,2,1];
val it =
   [[1,2,1,2,1,2,3,4,3,2,1,2,1,2,1],[1,2,1,3,1,3,2,3,2,3,1,3,1,2,1],
    [1,2,1,3,1,3,2,4,2,3,1,3,1,2,1],[1,2,1,3,1,3,4,3,4,3,1,3,1,2,1],
    [1,2,1,3,1,3,4,5,4,3,1,3,1,2,1],[1,2,1,2,3,2,3,1,3,2,3,2,1,2,1],
    [1,2,1,2,3,2,4,1,4,2,3,2,1,2,1],[1,2,1,2,3,2,3,4,3,2,3,2,1,2,1],
    [1,2,1,2,3,2,4,5,4,2,3,2,1,2,1],[1,2,1,3,4,3,2,1,2,3,4,3,1,2,1],
    [1,2,1,3,4,3,4,1,4,3,4,3,1,2,1],[1,2,1,3,4,3,5,1,5,3,4,3,1,2,1],
    [1,2,1,3,4,3,2,3,2,3,4,3,1,2,1],[1,2,1,3,4,3,2,5,2,3,4,3,1,2,1],
    [1,2,1,3,4,3,4,3,4,3,4,3,1,2,1],[1,2,1,3,4,3,5,3,5,3,4,3,1,2,1],
    [1,2,1,3,4,3,4,5,4,3,4,3,1,2,1],[1,2,1,3,4,3,5,6,5,3,4,3,1,2,1]]
   : int list list
- length it;
val it = 18 : int
length of palindromes: |[1,2,1|x|1,2,3,2,1| = 15
- length(kmul[1,2,3][1,2,3]);
```

val it = 588 : int

List.filter ispalindrome "kmul[1,2,3][1,2,3]": 44 palindromes
 [[1,2,3,2,3,1,3,1,2],[1,2,3,3,1,2,2,3,1],[1,2,3,2,1,4,3,4,1],
  [1,2,3,2,1,4,5,4,1],[1,2,3,2,4,1,3,1,2],[1,2,3,2,4,1,5,1,2],
  [1,2,3,4,1,2,3,4,1],[1,2,3,4,1,2,5,4,1],[1,2,3,3,1,4,4,5,1],
  [1,2,3,4,3,1,3,5,4],[1,2,3,4,1,5,2,3,1],[1,2,3,4,1,5,3,6,1],
  [1,2,3,4,1,5,6,7,1],[1,2,3,4,5,1,2,3,4],[1,2,3,4,5,1,3,6,4],
  [1,2,3,4,5,1,6,7,4],[1,2,3,2,3,4,3,4,1],[1,2,3,2,3,4,3,4,5],
  [1,2,3,3,4,2,2,3,1],[1,2,3,3,4,2,2,3,5],[1,2,3,4,3,2,3,4,1],
  [1,2,3,4,3,2,3,4,5],[1,2,3,2,4,5,3,5,1],[1,2,3,2,4,5,6,5,1],
  [1,2,3,2,4,5,3,5,6],[1,2,3,2,4,5,6,5,7],[1,2,3,4,5,2,3,4,1],
  [1,2,3,4,5,2,6,4,1],[1,2,3,4,5,2,3,4,6],[1,2,3,4,5,2,6,4,7],
  [1,2,3,3,4,5,5,1,2],[1,2,3,3,4,5,5,6,1],[1,2,3,3,4,5,5,6,7],
  [1,2,3,4,3,5,3,1,2],[1,2,3,4,3,5,3,6,1],[1,2,3,4,3,5,3,6,7],
  [1,2,3,4,5,6,2,3,1],[1,2,3,4,5,6,3,1,2],[1,2,3,4,5,6,7,1,2],
  [1,2,3,4,5,6,3,7,1],[1,2,3,4,5,6,7,8,1],[1,2,3,4,5,6,2,3,7],
  [1,2,3,4,5,6,3,7,8],[1,2,3,4,5,6,7,8,9]] : int list list

List.filter ispalindrome "kmul[1,2,1][1,2,1]": 4 palindromes
 [[1,2,1,2,1,2,1,2,1],[1,2,1,3,1,3,1,2,1],[1,2,1,2,3,2,1,2,1],
  [1,2,1,3,4,3,1,2,1]] : int list list

2. Palindromes

palindromes: asymPalin(8), includs symPalin(8)
   val it =
   [[1,1,1,1,1,1,1,1],[1,1,1,1,2,2,2,2],[1,1,1,2,1,2,2,2],[1,1,2,1,2,1,2,2],
    [1,1,2,2,1,1,2,2],[1,1,2,2,2,2,1,1],[1,2,1,1,2,2,1,2],[1,2,1,2,1,2,1,2],
    [1,2,1,2,2,1,2,1],[1,2,2,1,1,2,2,1],[1,2,2,1,2,1,1,2],[1,2,2,2,1,1,1,2],
    [1,1,1,2,2,1,1,1],[1,1,2,1,1,2,1,1],[1,2,1,1,1,1,2,1],[1,2,2,2,2,2,2,1],
    [1,1,1,2,2,3,3,3],[1,1,2,3,3,1,2,2],[1,1,2,1,3,2,3,3],[1,1,2,3,1,2,3,3],
    [1,2,1,3,3,2,1,2],[1,2,2,3,3,1,1,2],[1,2,3,1,2,3,1,2],[1,2,3,2,1,3,1,2],
    [1,2,1,3,3,2,3],[1,2,1,3,1,3,2,3],[1,2,3,1,3,1,2,3],[1,2,3,3,1,1,2,3],
    [1,2,2,2,3,3,3,1],[1,2,2,3,2,3,3,1],[1,2,3,2,3,2,3,1],[1,2,3,3,2,2,3,1],
    [1,1,2,2,3,3,1,1],[1,1,2,3,2,3,1,1],[1,1,2,3,3,2,1,1],[1,2,1,2,3,1,3,1],
    [1,2,1,3,2,1,3,1],[1,2,1,3,3,1,2,1],[1,2,2,1,1,3,3,1],[1,2,3,1,1,2,3,1],
    [1,2,3,1,1,3,2,1],[1,2,2,1,3,2,2,3],[1,2,2,3,1,2,2,3],[1,2,2,3,3,2,2,1],
    [1,2,1,2,2,3,2,3],[1,2,3,2,2,1,2,3],[1,2,3,2,2,3,2,1],[1,1,2,2,2,2,3,3],
    [1,2,3,3,3,3,1,2],[1,2,3,3,3,3,2,1],[1,1,1,2,3,1,1,1],[1,1,2,1,1,3,1,1],
    [1,2,1,1,1,1,3,1],[1,2,2,2,2,2,2,3],[1,1,2,2,3,3,4,4],[1,1,2,3,2,3,4,4],
    [1,1,2,3,3,2,4,4],[1,2,1,2,3,4,3,4],[1,2,1,3,2,4,3,4],[1,2,1,3,3,4,2,4],
    [1,2,2,1,3,4,4,3],[1,2,2,3,1,4,4,3],[1,2,2,3,3,4,4,1],[1,2,3,1,4,2,3,4],
    [1,2,3,1,4,3,2,4],[1,2,3,2,4,1,4,3],[1,2,3,2,4,3,4,1],[1,2,3,3,4,4,1,2],
    [1,2,3,3,4,4,2,1],[1,2,3,4,1,2,3,4],[1,2,3,4,1,3,2,4],[1,2,3,4,2,1,4,3],
    [1,2,3,4,2,3,4,1],[1,2,3,4,3,3,4,1,2],[1,2,3,4,3,4,2,1],[1,2,3,4,4,1,2,3],
    [1,2,3,4,4,2,3,1],[1,2,3,4,4,3,1,2],[1,2,3,4,4,3,2,1],[1,1,1,2,3,4,4,4],
    [1,1,2,3,4,1,2,2],[1,1,2,1,3,4,3,3],[1,1,2,3,1,4,3,3],[1,2,1,3,4,2,1,2],
    [1,2,2,3,4,1,1,2],[1,2,3,1,2,4,1,2],[1,2,3,2,1,4,1,2],[1,2,1,1,3,3,4,3],
    [1,2,1,3,1,3,4,3],[1,2,3,1,3,1,4,3],[1,2,3,3,1,1,4,3],[1,2,2,2,3,3,3,4],
    [1,2,2,3,2,3,3,4],[1,2,3,2,3,2,3,4],[1,2,3,3,2,2,3,4],[1,1,2,3,4,2,1,1],
    [1,1,2,3,3,4,1,1],[1,2,1,3,4,1,2,1],[1,2,3,1,1,4,2,1],[1,2,1,3,3,1,4,1],
    [1,2,3,1,1,3,4,1],[1,2,2,3,4,2,2,1],[1,2,3,2,2,4,2,1],[1,2,3,3,3,3,4,1],
    [1,2,2,3,3,2,2,4],[1,2,3,2,2,3,2,4],[1,2,3,3,3,3,2,4],[1,1,2,3,4,2,5,5],
    [1,1,2,3,3,4,5,5],[1,2,1,3,4,5,2,5],[1,2,2,3,4,5,5,1],[1,2,3,4,5,1,2,3],
    [1,2,3,4,5,2,3,1],[1,2,3,4,5,3,1,2],[1,2,3,4,5,3,2,1],[1,2,3,1,4,5,2,4],

[1,2,3,2,4,5,4,1],[1,2,3,4,1,5,2,4],[1,2,3,4,2,5,4,1],[1,2,3,4,4,5,1,2],
[1,2,3,4,4,5,2,1],[1,2,1,3,3,4,5,4],[1,2,3,1,4,3,5,4],[1,2,3,3,4,4,5,1],
[1,2,3,4,1,3,5,4],[1,2,3,4,3,4,5,1],[1,2,3,4,4,1,5,3],[1,2,3,4,4,3,5,1],
[1,2,2,3,3,4,4,5],[1,2,3,2,4,3,4,5],[1,2,3,3,4,4,2,5],[1,2,3,4,2,3,4,5],
[1,2,3,4,3,4,2,5],[1,2,3,4,4,2,3,5],[1,2,3,4,4,3,2,5],[1,1,2,3,4,5,1,1],
[1,2,1,3,4,1,5,1],[1,2,3,1,1,4,5,1],[1,2,2,3,4,2,2,5],[1,2,3,2,2,4,2,5],
[1,2,3,3,3,3,4,5],[1,1,2,3,4,5,6,6],[1,2,3,4,5,6,1,2],[1,2,3,4,5,6,2,1],
[1,2,1,3,4,5,6,5],[1,2,3,4,5,1,6,3],[1,2,3,4,5,3,6,1],[1,2,3,1,4,5,6,4],
[1,2,3,4,1,5,6,4],[1,2,3,4,4,5,6,1],[1,2,2,3,4,5,5,6],[1,2,3,4,5,2,3,6],
[1,2,3,4,5,3,2,6],[1,2,3,2,4,5,4,6],[1,2,3,4,2,5,4,6],[1,2,3,4,4,5,2,6],
[1,2,3,3,4,4,5,6],[1,2,3,4,3,4,5,6],[1,2,3,4,4,3,5,6],[1,2,3,4,5,6,7,1],
[1,2,3,4,5,6,2,7],[1,2,3,4,5,3,6,7],[1,2,3,4,4,5,6,7],[1,2,3,4,5,6,7,8]]
: int list list
length it;

val it=164
Palindromes from [1] to [1,2,3,4,5,6,7]:
[[**1**],
[1,1],[1,**2**],
[1,1,1],[1,2,1],[1,2,**3**],
[1,1,1,1],[1,1,2,2],[1,2,1,2], [1,2,2,1],[1,2,2,3],[1,2,3,1],[1,2,3,**4**],
[1,1,1,1,1], [1,1,2,1,1],[1,1,2,3,3],[1,2,1,2,1],[1,2,1,3,1],[1,2,2,2,1],[1,2,2,2,3],
                    [1,2,3,1,2],[1,2,3,2,1],[1,2,3,2,4],[1,2,3,4,1],[1,2,3,4,**5**],
[1,1,1,1,1,1],[1,1,1,2,2,2],[1,1,2,1,2,2],[1,1,2,2,1,1],[1,1,2,2,3,3],[1,1,2,3,1,1],[1,1,2,3,4,4],
      [1,2,1,1,2,1],[1,2,1,1,3,1],[1,2,1,2,1,2],[1,2,1,3,2,3], [1,2,1,3,4,3],[1,2,2,1,1,2],[1,2,2,2,2,1],
      [1,2,2,2,2,3],[1,2,2,3,3,1],[1,2,2,3,3,4], [1,2,3,1,2,3],[1,2,3,1,4,3],[1,2,3,2,3,1],[1,2,3,2,3,4],
[1,2,3,3,1,2],
      [1,2,3,3,2,1], [1,2,3,3,2,4],[1,2,3,3,4,1],[1,2,3,3,4,5], [1,2,3,4,1,2], [1,2,3,4,2,1],[1,2,3,4,2,5],
[1,2,3,4,5,1],[1,2,3,4,5,**6**],
[1,1,1,1,1,1,1],
  [1,1,1,2,1,1,1],[1,1,1,2,3,3,3],[1,1,2,1,2,1,1],
  [1,1,2,1,3,1,1],[1,1,2,2,2,1,1],[1,1,2,2,2,3,3],[1,1,2,3,1,2,2],
  [1,1,2,3,2,1,1],[1,1,2,3,2,4,4],[1,1,2,3,4,1,1],[1,1,2,3,4,5,5],
  [1,2,1,1,1,2,1],[1,2,1,1,1,3,1],[1,2,1,2,1,2,1],[1,2,1,2,3,2,3],
  [1,2,1,3,1,2,1],[1,2,1,3,1,4,1],[1,2,1,3,2,1,2],[1,2,1,3,4,2,4],
  [1,2,1,3,4,5,4],[1,2,2,1,2,2,1],[1,2,2,1,3,3,1],[1,2,2,2,2,2,1],
  [1,2,2,2,2,2,3],[1,2,2,3,1,1,2],[1,2,2,3,2,2,1],[1,2,2,3,2,2,4],
  [1,2,2,3,4,4,1],[1,2,2,3,4,4,5],[1,2,3,1,2,3,1],[1,2,3,1,3,2,1],
  [1,2,3,1,3,4,1],[1,2,3,1,4,2,1],[1,2,3,1,4,5,1],[1,2,3,2,1,2,3],
  [1,2,3,2,3,2,1],[1,2,3,2,3,2,4],[1,2,3,2,4,2,1],[1,2,3,2,4,2,5],
  [1,2,3,3,3,1,2],[1,2,3,3,3,2,1],[1,2,3,3,3,2,4],[1,2,3,3,3,4,1],
  [1,2,3,3,3,4,5],[1,2,3,4,1,2,3],[1,2,3,4,1,5,3],[1,2,3,4,2,3,1],
  [1,2,3,4,2,3,5],[1,2,3,4,3,1,2],[1,2,3,4,3,2,1],[1,2,3,4,3,2,5],
  [1,2,3,4,3,5,1],[1,2,3,4,3,5,6],[1,2,3,4,5,1,2],[1,2,3,4,5,2,1],
  [1,2,3,4,5,2,6],[1,2,3,4,5,6,1],[1,2,3,4,5,6,**7**].
Symmetric palindromes from [1] to [1,2,3,4,5,6,7]: 31
[[1],[1,1],
[1,1,1],[1,2,1],
[1,1,1,1],[1,2,2,1],
[1,1,1,1,1],[1,1,2,1,1],[1,2,1,2,1],[1,2,2,2,1],[1,2,3,2,1],
[1,1,1,1,1,1],[1,1,2,2,1,1],[1,2,1,1,2,1],[1,2,2,2,2,1],[1,2,3,3,2,1],
[1,1,1,1,1,1,1],[1,1,1,2,1,1,1],
              [1,1,2,1,2,1,1],[1,1,2,2,2,1,1],[1,1,2,3,2,1,1],[1,2,1,1,1,2,1],
              [1,2,1,2,1,2,1],[1,2,1,3,1,2,1],[1,2,2,1,2,2,1],[1,2,2,2,2,2,1],
              [1,2,2,3,2,2,1],[1,2,3,1,3,2,1],[1,2,3,2,3,2,1],[1,2,3,3,3,2,1],[1,2,3,4,3,2,1]] : int list list

3. Palindromes and Tcontextures

Tcontexture (9, 2)

[[1,1,1,1,1,1,1,1,1],[1,1,1,1,1,2,2,2,2],[1,1,1,1,2,1,2,2,2],
[1,1,1,1,2,2,1,2,2],[1,1,1,1,2,2,2,1,2],[1,1,1,1,2,2,2,2,1],
[1,1,1,2,1,1,2,2,2],[1,1,1,2,1,2,1,2,2],[1,1,1,2,1,2,2,1,2],
[1,1,1,2,1,2,2,2,1],[1,1,1,2,2,1,1,2,2],[1,1,1,2,2,1,2,1,2],
[1,1,1,2,2,1,2,2,1],[1,1,1,2,2,2,1,1,2],[1,1,1,2,2,2,1,2,1],
[1,1,1,2,2,2,2,1,1],[1,1,2,1,1,1,2,2,2],[1,1,2,1,1,2,1,2,2],
[1,1,2,1,1,2,2,1,2],[1,1,2,1,1,2,2,2,1],[1,1,2,1,2,1,1,2,2],
[1,1,2,1,2,1,2,1,2],[1,1,2,1,2,1,2,2,1],[1,1,2,1,2,2,1,1,2],
[1,1,2,1,2,2,1,2,1],[1,1,2,1,2,2,2,1,1],[1,1,2,2,1,1,1,2,2],
[1,1,2,2,1,1,2,1,2],[1,1,2,2,1,1,2,2,1],[1,1,2,2,1,2,1,1,2],
[1,1,2,2,1,2,1,2,1],[1,1,2,2,1,2,2,1,1],[1,1,2,2,2,1,1,1,2],
[1,1,2,2,2,1,1,2,1],[1,1,2,2,2,1,2,1,1],[1,1,2,2,2,2,1,1,1],
[1,2,1,1,1,2,2,2],[1,2,1,1,1,2,1,2,2],[1,2,1,1,1,2,2,1,2],
[1,2,1,1,1,2,2,2,1],[1,2,1,1,2,1,1,2,2],[1,2,1,1,2,1,2,1,2],
[1,2,1,1,2,1,2,2,1],[1,2,1,1,2,2,1,1,2],[1,2,1,1,2,2,1,2,1],
[1,2,1,1,2,2,2,1,1],[1,2,1,2,1,1,1,2,2],[1,2,1,2,1,1,2,1,2],
[1,2,1,2,1,1,2,2,1],[1,2,1,2,1,2,1,1,2],[1,2,1,2,1,2,1,2,1],
[1,2,1,2,1,2,2,1,1],[1,2,1,2,2,1,1,1,2],[1,2,1,2,2,1,1,2,1],
[1,2,1,2,2,1,2,1,1],[1,2,1,2,2,2,1,1,1],[1,2,2,1,1,1,1,2,2],
[1,2,2,1,1,1,2,1,2],[1,2,2,1,1,1,2,2,1],[1,2,2,1,1,2,1,1,2],
[1,2,2,1,1,2,1,2,1],[1,2,2,1,1,2,2,1,1],[1,2,2,1,2,1,1,1,2],
[1,2,2,1,2,1,1,2,1],[1,2,2,1,2,1,2,1,1],[1,2,2,1,2,2,1,1,1],
[1,2,2,2,1,1,1,1,2],[1,2,2,2,1,1,1,2,1],[1,2,2,2,1,1,2,1,1],
[1,2,2,2,1,2,1,1,1],[1,2,2,2,2,1,1,1,1],[1,2,2,2,2,2,1,1,1],
[1,2,2,2,2,1,2,1,1],[1,2,2,2,2,1,1,2,1],[1,2,2,2,2,1,1,1,2],
[1,2,2,2,1,2,2,1,1],[1,2,2,2,1,2,1,2,1],[1,2,2,2,1,2,1,1,2],
[1,2,2,2,1,1,2,2,1],[1,2,2,2,1,1,2,1,2],[1,2,2,2,1,1,1,2,2],
[1,2,2,1,2,2,2,1,1],[1,2,2,1,2,2,1,2,1],[1,2,2,1,2,2,1,1,2],
[1,2,2,1,2,1,2,2,1],[1,2,2,1,2,1,2,1,2],[1,2,2,1,2,1,1,2,2],
[1,2,2,1,1,2,2,2,1],[1,2,1,2,2,2,2,1,1],[1,2,1,2,2,2,1,2,1],
[1,2,1,2,2,2,1,1,2],[1,2,1,2,2,1,2,2,1],[1,2,1,2,2,1,2,1,2],
[1,2,1,2,2,1,1,2,2],[1,2,1,2,1,2,2,2,1],[1,2,1,2,1,2,2,1,2],
[1,2,1,2,1,2,1,2,2],[1,2,1,2,1,1,2,2,2],[1,2,1,1,2,2,2,2,1],
[1,2,1,1,2,2,2,1,2],[1,2,1,1,2,2,1,2,2],[1,2,1,1,2,1,2,2,2],
[1,2,1,1,1,2,2,2,2],[1,1,2,2,2,2,2,1,1],[1,1,2,2,2,2,1,2,1],
[1,1,2,2,2,2,1,1,2],[1,1,2,2,2,1,2,2,1],[1,1,2,2,2,1,2,1,2],
[1,1,2,2,2,1,1,2,2],[1,1,2,2,1,2,2,2,1],[1,1,2,2,1,2,2,1,2],
[1,1,2,2,1,2,1,2,2],[1,1,2,2,1,1,2,2,2],[1,1,2,1,2,2,2,2,1],
[1,1,2,1,2,2,2,1,2],[1,1,2,1,2,2,1,2,2],[1,1,2,1,2,1,2,2,2],
[1,1,2,1,1,2,2,2,2],[1,1,1,2,2,2,2,2,1],[1,1,1,2,2,2,2,1,2],
[1,1,1,2,2,2,1,2,2],[1,1,1,2,2,1,2,2,2],[1,1,1,2,1,2,2,2,2],
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[1,1,1,2,1,1,1,1,1],[1,1,2,1,1,1,1,1,1],[1,2,1,1,1,1,1,1,1],
[1,2,2,2,2,2,2,2,2]

Palindromes (9,2): 16
 [[1,1,1,1,1,1,1,1,1],[1,1,2,2,1,2,2,1,1],[1,2,1,2,1,2,1,2,1],
  [1,2,2,1,1,1,2,2,1],[1,2,2,1,2,1,2,2,1],[1,2,1,2,2,2,1,2,1],
  [1,1,2,2,2,2,2,1,1],[1,1,1,2,2,2,1,1,1],[1,1,2,1,2,1,2,1,1],
  [1,2,1,1,2,1,1,2,1],[1,2,2,2,1,2,2,2,1],[1,1,1,2,1,2,1,1,1],
  [1,1,2,1,1,1,2,1,1],[1,2,1,1,1,1,1,2,1],[1,2,2,2,2,2,2,2,1],
  [1,1,1,1,2,1,1,1,1]] : int list list

Tcontexture (9,3):
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  [1,1,1,2,2,3,3,2,3],[1,1,1,2,2,3,3,3,2],[1,1,1,2,3,2,2,3,3],
  [1,1,1,2,3,2,3,2,3],[1,1,1,2,3,2,3,3,2],[1,1,1,2,3,3,2,2,3],
  [1,1,1,2,3,3,2,3,2],[1,1,1,2,3,3,3,2,2],[1,1,2,1,2,2,3,3,3],
  [1,1,2,1,2,3,2,3,3],[1,1,2,1,2,3,3,2,3],[1,1,2,1,2,3,3,3,2],
  [1,1,2,1,3,2,2,3,3],[1,1,2,1,3,2,3,2,3],[1,1,2,1,3,2,3,3,2],
  [1,1,2,1,3,3,2,2,3],[1,1,2,1,3,3,2,3,2],[1,1,2,1,3,3,3,2,2],
  [1,1,2,2,1,2,3,3,3],[1,1,2,2,1,3,2,3,3],[1,1,2,2,1,3,3,2,3],
  [1,1,2,2,1,3,3,3,2],[1,1,2,2,2,1,3,3,3],[1,1,2,2,2,3,1,3,3],
  [1,1,2,2,2,3,3,1,3],[1,1,2,2,2,3,3,3,1],[1,1,2,2,3,1,2,3,3],
  [1,1,2,2,3,1,3,2,3],[1,1,2,2,3,1,3,3,2],[1,1,2,2,3,2,1,3,3],

[1,1,2,2,3,2,3,1,3],[1,1,2,2,3,2,3,3,1],[1,1,2,2,3,3,1,2,3],
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[1,1,2,1,3,1,1,1,2],[1,1,2,1,3,1,1,2,1],[1,1,2,1,3,1,2,1,1],
[1,1,2,1,3,2,1,1,1],[1,1,2,2,1,1,1,1,3],[1,1,2,2,1,1,1,3,1],
[1,1,2,2,1,1,3,1,1],[1,1,2,2,1,3,1,1,1],[1,1,2,2,3,1,1,1,1],
[1,1,2,3,1,1,1,1,2],[1,1,2,3,1,1,1,2,1],[1,1,2,3,1,1,2,1,1],
[1,1,2,3,1,2,1,1,1],[1,1,2,3,2,1,1,1,1],[1,1,2,1,1,1,1,3,3],
[1,1,2,1,1,1,3,1,3],[1,1,2,1,1,1,3,3,1],[1,1,2,1,1,3,1,1,3],
[1,1,2,1,1,3,1,3,1],[1,1,2,1,1,3,3,1,1],[1,1,2,1,3,1,1,1,3],
[1,1,2,1,3,1,1,3,1],[1,1,2,1,3,1,3,1,1],[1,1,2,1,3,3,1,1,1],
[1,1,2,3,1,1,1,1,3],[1,1,2,3,1,1,1,3,1],[1,1,2,3,1,1,3,1,1],
[1,1,2,3,1,3,1,1,1],[1,1,2,3,3,1,1,1,1],[1,2,1,1,1,1,1,2,3],
[1,2,1,1,1,1,1,3,2],[1,2,1,1,1,1,2,1,3],[1,2,1,1,1,1,2,3,1],
[1,2,1,1,1,1,3,1,2],[1,2,1,1,1,1,3,2,1],[1,2,1,1,1,2,1,1,3],
[1,2,1,1,1,2,1,3,1],[1,2,1,1,1,2,3,1,1],[1,2,1,1,1,3,1,1,2],
[1,2,1,1,1,3,1,2,1],[1,2,1,1,1,3,2,1,1],[1,2,1,1,2,1,1,1,3],
[1,2,1,1,2,1,1,3,1],[1,2,1,1,2,1,3,1,1],[1,2,1,1,2,3,1,1,1],
[1,2,1,1,3,1,1,1,2],[1,2,1,1,3,1,1,2,1],[1,2,1,1,3,1,2,1,1],
[1,2,1,1,3,2,1,1,1],[1,2,1,2,1,1,1,1,3],[1,2,1,2,1,1,1,3,1],
[1,2,1,2,1,1,3,1,1],[1,2,1,2,1,3,1,1,1],[1,2,1,2,3,1,1,1,1],
[1,2,1,3,1,1,1,1,2],[1,2,1,3,1,1,1,2,1],[1,2,1,3,1,1,2,1,1],
[1,2,1,3,1,2,1,1,1],[1,2,1,3,2,1,1,1,1],[1,2,2,1,1,1,1,1,3],
[1,2,2,1,1,1,1,3,1],[1,2,2,1,1,1,3,1,1],[1,2,2,1,1,3,1,1,1],
[1,2,2,1,3,1,1,1,1],[1,2,2,3,1,1,1,1,1],[1,2,3,1,1,1,1,1,2],
[1,2,3,1,1,1,1,2,1],[1,2,3,1,1,1,2,1,1],[1,2,3,1,1,2,1,1,1],
[1,2,3,1,2,1,1,1,1],[1,2,3,2,1,1,1,1,1],[1,2,1,1,1,1,1,3,3],
[1,2,1,1,1,1,3,1,3],[1,2,1,1,1,1,3,3,1],[1,2,1,1,1,3,1,3,1],
[1,2,1,1,1,3,1,3,1],[1,2,1,1,1,3,3,1,1],[1,2,1,1,3,1,1,1,3],
[1,2,1,1,3,1,1,3,1],[1,2,1,1,3,1,3,1,1],[1,2,1,1,3,3,1,1,1],
[1,2,1,3,1,1,1,1,3],[1,2,1,3,1,1,1,3,1],[1,2,1,3,1,1,3,1,1],
[1,2,1,3,1,3,1,1,1],[1,2,1,3,3,1,1,1,1],[1,2,3,1,1,1,1,1,3],
[1,2,3,1,1,1,1,3,1],[1,2,3,1,1,1,3,1,1],[1,2,3,1,1,3,1,1,1],
[1,2,3,1,3,1,1,1,1],[1,2,3,3,1,1,1,1,1],[1,2,2,2,2,2,2,1,3],
[1,2,2,2,2,2,2,3,1],[1,2,2,2,2,2,1,2,3],[1,2,2,2,2,2,1,3,2],
[1,2,2,2,2,2,3,2,1],[1,2,2,2,2,2,3,1,2],[1,2,2,2,2,1,2,2,3],
[1,2,2,2,2,1,2,3,2],[1,2,2,2,2,1,3,2,2],[1,2,2,2,2,3,2,2,1],
[1,2,2,2,2,3,2,1,2],[1,2,2,2,2,3,1,2,2],[1,2,2,2,1,2,2,2,3],
[1,2,2,2,1,2,2,3,2],[1,2,2,2,1,2,3,2,2],[1,2,2,2,1,3,2,2,2],
[1,2,2,2,3,2,2,2,1],[1,2,2,2,3,2,2,1,2],[1,2,2,2,3,2,1,2,2],
[1,2,2,2,3,1,2,2,2],[1,2,2,1,2,2,2,2,3],[1,2,2,1,2,2,2,3,2],
[1,2,2,1,2,2,3,2,2],[1,2,2,1,2,3,2,2,2],[1,2,2,1,3,2,2,2,2],
[1,2,2,3,2,2,2,2,1],[1,2,2,3,2,2,2,1,2],[1,2,2,3,2,2,1,2,2],
[1,2,2,3,2,1,2,2,2],[1,2,2,3,1,2,2,2,2],[1,2,1,2,2,2,2,2,3],
[1,2,1,2,2,2,2,3,2],[1,2,1,2,2,2,3,2,2],[1,2,1,2,2,3,2,2,2],
[1,2,1,2,3,2,2,2,2],[1,2,1,3,2,2,2,2,2],[1,2,3,2,2,2,2,2,1],
[1,2,3,2,2,2,2,1,2],[1,2,3,2,2,2,1,2,2],[1,2,3,2,2,1,2,2,2],
[1,2,3,2,1,2,2,2,2],[1,2,3,1,2,2,2,2,2],[1,1,2,2,2,2,2,2,3],

[1,1,2,2,2,2,2,3,2],[1,1,2,2,2,2,3,2,2],[1,1,2,2,2,3,2,2,2],
[1,1,2,2,3,2,2,2,2],[1,1,2,3,2,2,2,2,2],[1,1,2,3,3,3,3,3,3],
[1,2,3,3,3,3,3,3,1],[1,2,3,3,3,3,3,1,3],[1,2,3,3,3,3,1,3,3],
[1,2,3,3,3,1,3,3,3],[1,2,3,3,1,3,3,3,3],[1,2,3,1,3,3,3,3,3],
[1,2,1,3,3,3,3,3,3],[1,2,2,2,2,2,2,3,3],[1,2,2,2,2,2,3,3,2,3],
[1,2,2,2,2,2,3,3,2],[1,2,2,2,2,3,2,2,3],[1,2,2,2,2,3,2,3,2],
[1,2,2,2,2,3,3,2,2],[1,2,2,2,3,2,2,2,3],[1,2,2,2,3,2,2,3,2],
[1,2,2,2,3,2,3,3,2],[1,2,2,2,3,3,3,2,2],[1,2,2,3,2,2,2,2,3],
[1,2,2,3,2,2,2,3,2],[1,2,2,3,2,2,3,2,2],[1,2,2,3,2,3,2,2,2],
[1,2,2,3,3,2,2,2,2],[1,2,3,2,2,2,2,2,3],[1,2,3,2,2,2,2,3,2],
[1,2,3,2,2,2,3,2,2],[1,2,3,2,2,3,2,2,2],[1,2,3,2,3,2,2,2,2],
[1,2,3,3,2,2,2,2,2],[1,2,3,3,3,3,3,3,2],[1,2,3,3,3,3,3,2,3],
[1,2,3,3,3,3,2,3,3],[1,2,3,3,3,2,3,3,3],[1,2,3,3,2,3,3,3,3],
[1,2,3,2,3,3,3,3,3],[1,2,2,3,3,3,3,3,3],[1,1,1,1,1,1,1,2,3],
[1,1,1,1,1,1,2,1,3],[1,1,1,1,1,1,2,3,1],[1,1,1,1,1,2,1,1,3],
[1,1,1,1,1,2,1,3,1],[1,1,1,1,1,2,3,1,1],[1,1,1,1,2,1,1,1,3],
[1,1,1,1,2,1,1,3,1],[1,1,1,1,2,1,3,1,1],[1,1,1,1,2,3,1,1,1],
[1,1,1,2,1,1,1,1,3],[1,1,1,2,1,1,1,3,1],[1,1,1,2,1,1,3,1,1],
[1,1,1,2,1,3,1,1,1],[1,1,1,2,3,1,1,1,1],[1,1,2,1,1,1,1,1,3],
[1,1,2,1,1,1,1,3,1],[1,1,2,1,1,1,3,1,1],[1,1,2,1,1,3,1,1,1],
[1,1,2,1,3,1,1,1,1],[1,1,2,3,1,1,1,1,1],[1,2,1,1,1,1,1,1,3],
[1,2,1,1,1,1,1,3,1],[1,2,1,1,1,1,3,1,1],[1,2,1,1,1,3,1,1,1],
[1,2,1,1,3,1,1,1,1],[1,2,1,3,1,1,1,1,1],[1,2,3,1,1,1,1,1,1],
[1,2,2,2,2,2,2,2,3],[1,2,2,2,2,2,2,3,2],[1,2,2,2,2,2,3,2,2],
[1,2,2,2,2,3,2,2,2],[1,2,2,2,3,2,2,2,2],[1,2,2,3,2,2,2,2,2],
[1,2,3,2,2,2,2,2,2],[1,2,3,3,3,3,3,3,3]

Palindromes (9, 3): 65

[[1,1,1,2,2,2,3,3,3],[1,1,2,1,2,3,2,3,3],[1,1,2,3,2,1,2,3,3],
[1,1,2,3,3,3,1,2,2],[1,2,1,1,2,3,3,2,3],[1,2,1,3,2,1,3,2,3],
[1,2,1,3,3,3,2,1,2],[1,2,2,2,1,3,3,3,1],[1,2,2,3,1,2,3,3,1],
[1,2,2,3,3,3,1,1,2],[1,2,3,1,2,3,1,2,3],[1,2,3,1,3,2,3,1,2],
[1,2,3,2,1,3,2,3,1],[1,2,3,2,3,1,3,1,2],[1,2,3,3,1,2,2,3,1],
[1,2,3,3,2,1,1,2,3],[1,1,2,3,2,3,2,1,1],[1,1,2,3,3,3,2,1,1],
[1,2,1,3,2,3,1,2,1],[1,2,3,1,2,1,3,2,1],[1,2,1,3,3,3,1,2,1],
[1,2,3,1,3,1,3,2,1],[1,2,2,3,1,3,2,2,1],[1,2,3,2,1,2,3,2,1],
[1,2,3,3,1,3,3,2,1],[1,2,2,3,3,3,2,2,1],[1,2,3,2,3,2,3,2,1],
[1,2,3,3,2,3,3,2,1],[1,1,1,1,2,3,3,3,3],[1,1,1,2,3,1,2,2,2],
[1,1,2,1,3,2,1,2,2],[1,1,2,2,3,1,1,2,2],[1,1,2,2,3,2,2,1,1],
[1,2,1,1,3,2,2,1,2],[1,2,1,2,3,1,2,1,2],[1,2,1,2,3,2,1,2,1],
[1,2,2,1,3,1,2,2,1],[1,2,2,1,3,2,1,1,2],[1,2,2,2,3,1,1,1,2],
[1,1,2,2,1,3,3,1,1],[1,1,2,3,1,2,3,1,1],[1,1,2,3,1,3,2,1,1],
[1,2,1,2,1,3,1,3,1],[1,2,1,3,1,2,1,3,1],[1,2,1,3,1,3,1,2,1],
[1,2,2,1,1,1,3,3,1],[1,2,3,1,1,1,2,3,1],[1,2,3,1,1,1,3,2,1],
[1,2,2,1,2,3,2,2,3],[1,2,2,3,2,1,2,2,3],[1,2,2,3,2,3,2,2,1],
[1,2,1,2,2,2,3,2,3],[1,2,3,2,2,2,1,2,3],[1,2,3,2,2,2,3,2,1],
[1,1,2,2,2,2,2,2,3],[1,2,3,3,3,3,3,1,2],[1,2,3,3,3,3,3,2,1],
[1,1,1,2,3,2,1,1,1],[1,1,2,1,3,1,2,1,1],[1,2,1,1,3,1,1,2,1],
[1,2,2,2,3,2,2,2,1],[1,1,1,2,1,3,1,1,1],[1,1,2,1,1,1,3,1,1],
[1,2,1,1,1,1,1,3,1],[1,2,2,2,2,2,2,2,3]] : int list list

Symmetric palindromes (9, 3): 25

[[1,1,2,3,2,3,2,1,1],[1,1,2,3,3,3,2,1,1],[1,2,1,3,2,3,1,2,1],
[1,2,3,1,2,1,3,2,1],[1,2,1,3,3,3,1,2,1],[1,2,3,1,3,1,3,2,1],
[1,2,2,3,1,3,2,2,1],[1,2,3,2,1,2,3,2,1],[1,2,3,3,1,3,3,2,1],

[1,2,2,3,3,3,2,2,1],[1,2,3,2,3,2,3,2,1],[1,2,3,3,2,3,3,2,1],
[1,1,2,2,3,2,2,1,1],[1,2,1,2,3,2,1,2,1],[1,2,2,1,3,1,2,2,1],
[1,1,2,3,1,3,2,1,1],[1,2,1,3,1,3,1,2,1],[1,2,3,1,1,1,3,2,1],
[1,2,2,3,2,3,2,2,1],[1,2,3,2,2,2,3,2,1],[1,2,3,3,3,3,3,2,1],
[1,1,1,2,3,2,1,1,1],[1,1,2,1,3,1,2,1,1],[1,2,1,1,3,1,1,2,1],
[1,2,2,2,3,2,2,2,1]

Tcontexture (9, 4):

[1,1,1,2,2,3,3,4,4],
 [1,1,1,2,2,3,4,3,4],[1,1,1,2,2,3,4,4,3],[1,1,1,2,3,2,3,4,4],
 [1,1,1,2,3,2,4,3,4],[1,1,1,2,3,2,4,4,3],[1,1,1,2,3,3,2,4,4],
 [1,1,1,2,3,3,4,2,4],[1,1,1,2,3,3,4,4,2],[1,1,1,2,3,4,2,3,4],
 [1,1,1,2,3,4,2,4,3],[1,1,1,2,3,4,3,2,4],[1,1,1,2,3,4,3,4,2],
 [1,1,1,2,3,4,4,2,3],[1,1,1,2,3,4,4,3,2],[1,1,2,1,2,3,3,4,4],
 [1,1,2,1,2,3,4,3,4],[1,1,2,1,2,3,4,4,3],[1,1,2,1,3,2,3,4,4],
 [1,1,2,1,3,2,4,3,4],[1,1,2,1,3,2,4,4,3],[1,1,2,1,3,3,2,4,4],
 [1,1,2,1,3,3,4,2,4],[1,1,2,1,3,3,4,4,2],[1,1,2,1,3,4,2,3,4],
 [1,1,2,1,3,4,2,4,3],[1,1,2,1,3,4,3,2,4],[1,1,2,1,3,4,3,4,2],
 [1,1,2,1,3,4,4,2,3],[1,1,2,1,3,4,4,3,2],[1,1,2,2,1,3,3,4,4],
 [1,1,2,2,1,3,4,3,4],[1,1,2,2,1,3,4,4,3],[1,1,2,2,3,1,3,4,4],
 [1,1,2,2,3,1,4,3,4],[1,1,2,2,3,1,4,4,3],[1,1,2,2,3,3,1,4,4],
 [1,1,2,2,3,3,4,1,4],[1,1,2,2,3,3,4,4,1],[1,1,2,2,3,4,1,3,4],
 [1,1,2,2,3,4,1,4,3],[1,1,2,2,3,4,3,1,4],[1,1,2,2,3,4,3,4,1],
 [1,1,2,2,3,4,4,1,3],[1,1,2,2,3,4,4,3,1],[1,1,2,3,1,2,3,4,4],
 [1,1,2,3,1,2,4,3,4],[1,1,2,3,1,2,4,4,3],[1,1,2,3,1,3,2,4,4],
 [1,1,2,3,1,3,4,2,4],[1,1,2,3,1,3,4,4,2],[1,1,2,3,1,4,2,3,4],
 [1,1,2,3,1,4,2,4,3],[1,1,2,3,1,4,3,2,4],[1,1,2,3,1,4,3,4,2],
 [1,1,2,3,1,4,4,2,3],[1,1,2,3,1,4,4,3,2],[1,1,2,3,2,1,3,4,4],
 [1,1,2,3,2,1,4,3,4],[1,1,2,3,2,1,4,4,3],[1,1,2,3,2,3,1,4,4],
 [1,1,2,3,2,3,4,1,4],[1,1,2,3,2,3,4,4,1],[1,1,2,3,2,4,1,3,4],
 [1,1,2,3,2,4,1,4,3],[1,1,2,3,2,4,3,1,4],[1,1,2,3,2,4,3,4,1],
 [1,1,2,3,2,4,4,1,3],[1,1,2,3,2,4,4,3,1],[1,1,2,3,3,1,2,4,4],
 [1,1,2,3,3,1,4,2,4],[1,1,2,3,3,1,4,4,2],[1,1,2,3,3,2,1,4,4],
 [1,1,2,3,3,2,4,1,4],[1,1,2,3,3,2,4,4,1],[1,1,2,3,3,4,1,2,4],
 [1,1,2,3,3,4,1,4,2],[1,1,2,3,3,4,2,1,4],[1,1,2,3,3,4,2,4,1],
 [1,1,2,3,3,4,4,1,2],[1,1,2,3,3,4,4,2,1],[1,1,2,3,4,1,2,3,4],
 [1,1,2,3,4,1,2,4,3],[1,1,2,3,4,1,3,2,4],[1,1,2,3,4,1,3,4,2],
 [1,1,2,3,4,1,4,2,3],[1,1,2,3,4,1,4,3,2],[1,1,2,3,4,2,1,3,4],
 [1,1,2,3,4,2,1,4,3],[1,1,2,3,4,2,3,1,4],[1,1,2,3,4,2,3,4,1],
 [1,1,2,3,4,2,4,1,3],[1,1,2,3,4,2,4,3,1],[1,1,2,3,4,3,1,2,4],
 [1,1,2,3,4,3,1,4,2],[1,1,2,3,4,3,2,1,4],[1,1,2,3,4,3,2,4,1],
 [1,1,2,3,4,3,4,1,2],[1,1,2,3,4,3,4,2,1],[1,1,2,3,4,4,1,2,3],
 [1,1,2,3,4,4,1,3,2],[1,1,2,3,4,4,2,1,3],[1,1,2,3,4,4,2,3,1],
 [1,1,2,3,4,4,3,1,2],[1,1,2,3,4,4,3,2,1],[1,2,1,1,2,3,3,4,4],
 [1,2,1,1,2,3,4,3,4],[1,2,1,1,2,3,4,4,3],[1,2,1,1,3,2,3,4,4],
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[1,2,1,3,1,1,1,4,1],[1,2,1,3,1,1,4,1,1],[1,2,1,3,1,4,1,1,1],
[1,2,1,3,4,1,1,1,1],[1,2,3,1,1,1,1,1,4],[1,2,3,1,1,1,1,4,1],
[1,2,3,1,1,1,4,1,1],[1,2,3,1,1,4,1,1,1],[1,2,3,1,4,1,1,1,1],
[1,2,3,4,1,1,1,1,1],[1,2,2,2,2,2,2,3,4],[1,2,2,2,2,2,3,2,4],
[1,2,2,2,2,2,3,4,2],[1,2,2,2,2,3,2,2,4],[1,2,2,2,2,3,2,4,2],
[1,2,2,2,2,3,4,2,2],[1,2,2,2,3,2,2,2,4],[1,2,2,2,3,2,2,4,2],

[1,2,2,2,3,2,4,2,2],[1,2,2,2,3,4,2,2,2],[1,2,2,3,2,2,2,2,4],
[1,2,2,3,2,2,2,4,2],[1,2,2,3,2,2,4,2,2],[1,2,2,3,2,4,2,2,2],
[1,2,2,3,4,2,2,2,2],[1,2,3,2,2,2,2,2,4],[1,2,3,2,2,2,2,4,2],
[1,2,3,2,2,2,4,2,2],[1,2,3,2,2,4,2,2,2],[1,2,3,2,4,2,2,2,2],
[1,2,3,4,2,2,2,2,2],[1,2,3,3,3,3,3,3,4],[1,2,3,3,3,3,3,4,3],
[1,2,3,3,3,3,4,3,3],[1,2,3,3,3,4,3,3,3],[1,2,3,3,4,3,3,3,3],
[1,2,3,4,3,3,3,3,3],[1,2,3,4,4,4,4,4,4]

Palindromes (9, 4)

  [[1,2,2,3,1,3,4,4,1],[1,2,3,2,1,4,3,4,1],[1,2,3,3,1,4,4,2,1],
  [1,2,3,4,1,2,3,4,1],[1,2,3,4,1,3,4,2,1],[1,2,3,4,1,4,2,3,1],
  [1,2,3,4,1,4,3,2,1],[1,2,1,3,2,3,4,2,4]]

[[1,2,3,1,2,4,3,2,4],[1,2,3,3,2,4,4,2,1],[1,2,3,4,2,1,3,2,4],
  [1,2,3,4,2,3,4,2,1],[1,2,3,4,2,4,1,2,3],[1,2,3,4,2,4,3,2,1],
  [1,1,2,3,2,3,2,4,4],[1,1,2,3,3,3,2,4,4],[1,2,3,1,3,4,3,2,4],
  [1,2,3,2,3,4,3,4,1],[1,2,3,4,3,1,3,2,4],[1,2,3,4,3,2,3,4,1],
  [1,2,3,4,3,4,3,1,2],[1,2,3,4,3,4,3,2,1],[1,2,1,3,3,3,3,4,2,4],
  [1,2,2,3,3,3,4,4,1],[1,2,3,4,4,4,1,2,3],[1,2,3,4,4,4,2,3,1],
  [1,2,3,4,4,4,3,1,2],[1,2,3,4,4,4,3,2,1],[1,1,1,2,3,2,4,4,4]]

[[1,1,2,3,4,3,1,2,2],[1,1,2,1,3,4,2,4,4],[1,1,2,3,4,1,2,3,3],
  [1,2,1,3,4,3,2,1,2],[1,2,2,3,4,3,1,1,2],[1,2,3,1,4,2,3,1,2],
  [1,2,3,2,4,1,3,1,2],[1,2,1,1,3,4,4,2,4],[1,2,1,3,4,1,3,2,3]]

[[1,2,3,1,4,3,1,2,3],[1,2,3,3,4,1,1,2,3],[1,2,2,2,3,4,4,4,1],
  [1,2,2,3,4,2,3,3,1],[1,2,3,2,4,3,2,3,1],[1,2,3,3,4,2,2,3,1],
  [1,1,2,2,3,4,4,1,1],[1,1,2,3,4,2,3,1,1],[1,1,2,3,4,3,2,1,1]]
[[1,2,1,2,3,4,1,4,1],[1,2,1,3,4,2,1,3,1],[1,2,1,3,4,3,1,2,1],
  [1,2,2,1,3,1,4,4,1],[1,2,3,1,4,1,2,3,1],[1,2,3,1,4,1,3,2,1],
  [1,2,2,1,3,4,2,2,4],[1,2,2,3,4,1,2,2,3],[1,2,2,3,4,3,2,2,1],
  [1,2,1,2,3,2,4,2,4],[1,2,3,2,4,2,1,2,3],[1,2,3,2,4,2,3,2,1],
  [1,1,2,2,3,2,2,4,4],[1,2,3,3,4,3,3,1,2],[1,2,3,3,4,3,3,2,1],
  [1,1,2,3,2,4,2,1,1],[1,1,2,3,3,3,4,1,1],[1,2,1,3,2,4,1,2,1],
  [1,2,3,1,2,1,4,2,1],[1,2,1,3,3,3,1,4,1],[1,2,3,1,3,1,3,4,1],
  [1,2,2,3,1,4,2,2,1],[1,2,3,2,1,2,4,2,1]]

[[1,2,3,3,1,3,3,4,1],[1,2,2,3,3,3,2,2,4],[1,2,3,2,3,2,3,2,4],
  [1,2,3,3,2,3,3,2,4],[1,1,2,3,1,4,2,1,1],[1,1,2,3,1,3,4,1,1],
  [1,2,1,3,1,4,1,2,1],[1,2,3,1,1,1,4,2,1],[1,2,1,3,1,3,1,4,1],
  [1,2,3,1,1,1,3,4,1],[1,2,2,3,2,4,2,2,1],[1,2,3,2,2,2,4,2,1],
  [1,2,3,3,3,3,3,4,1],[1,2,2,3,2,3,2,2,4],[1,2,3,2,2,2,3,2,4],
  [1,2,3,3,3,3,3,2,4],[1,1,1,2,3,4,1,1,1],[1,1,2,1,3,1,4,1,1],
  [1,2,1,1,3,1,1,4,1],[1,2,2,2,3,2,2,2,4]]

Reductions: Dcontexture
- Dcontexture 9: 30
val it =
  [[1,1,1,1,1,1,1,1,1],[1,1,1,1,1,2,2,2,2],[1,1,1,1,1,1,2,2,2],
  [1,1,1,1,1,1,1,2,2],[1,1,1,1,1,1,1,1,2],[1,1,1,2,2,2,3,3,3],
  [1,1,1,1,2,2,2,3,3],[1,1,1,1,2,2,2,2,3],[1,1,1,1,1,2,2,3,3],
  [1,1,1,1,1,2,2,2,3],[1,1,1,1,1,1,2,2,3],[1,1,1,1,1,1,1,2,3],

  [1,1,1,2,2,3,3,4,4],[1,1,1,2,2,2,3,3,4],[1,1,1,1,2,2,3,3,4],
  [1,1,1,1,2,2,2,3,4],[1,1,1,1,1,2,2,3,4],[1,1,1,1,1,1,2,3,4],

[1,1,2,2,3,3,4,4,5]],[1,1,1,2,2,3,3,4,5],[1,1,1,2,2,2,3,4,5],
[1,1,1,1,2,2,3,4,5],[1,1,1,1,1,2,3,4,5],[1,1,2,2,3,3,4,5,6],
[1,1,1,2,2,3,4,5,6],[1,1,1,1,2,3,4,5,6],[1,1,2,2,3,4,5,6,7],
[1,1,1,2,3,4,5,6,7],[1,1,2,3,4,5,6,7,8],[1,2,3,4,5,6,7,8,9]]
  : int list list
Palindrome "Dcontexture 9":
val it = [[1,1,1,1,1,1,1,1,1],[1,1,1,2,2,2,3,3,3],[1,2,3,4,5,6,7,8,9]]
  : int list list

Tcontexture (9,5); parts of Tcontexture (9,6)

[1,1,2,2,3,3,4,4,5],
  [1,1,2,2,3,3,4,5,4],[1,1,2,2,3,3,4,5,5],[1,1,2,2,3,4,3,4,5],
  [1,1,2,2,3,4,3,5,4],[1,1,2,2,3,4,4,3,5],[1,1,2,2,3,4,4,5,3],
  [1,1,2,2,3,4,5,3,4],[1,1,2,2,3,4,5,4,3],[1,1,2,2,3,4,3,5,5],
  [1,1,2,2,3,4,5,3,5],[1,1,2,2,3,4,5,5,3],[1,1,2,2,3,4,4,5,5],
  [1,1,2,2,3,4,5,4,5],[1,1,2,2,3,4,5,5,4],[1,1,2,3,2,3,4,4,5],
  [1,1,2,3,2,3,4,5,4],[1,1,2,3,2,3,4,5,5],[1,1,2,3,2,4,3,4,5],
  [1,1,2,3,2,4,3,5,4],[1,1,2,3,2,4,4,3,5],[1,1,2,3,2,4,4,5,3],
  [1,1,2,3,2,4,5,3,4],[1,1,2,3,2,4,5,4,3],[1,1,2,3,2,4,3,5,5],
  [1,1,2,3,2,4,5,3,5],[1,1,2,3,2,4,5,5,3],[1,1,2,3,3,2,4,4,5],
  [1,1,2,3,3,2,4,5,4],[1,1,2,3,3,2,4,5,5],[1,1,2,3,3,4,2,4,5],
  [1,1,2,3,3,4,2,5,4],[1,1,2,3,3,4,4,2,5],[1,1,2,3,3,4,4,5,2],
  [1,1,2,3,3,4,5,2,4],[1,1,2,3,3,4,5,4,2],[1,1,2,3,3,4,2,5,5],
  [1,1,2,3,3,4,5,2,5],[1,1,2,3,3,4,5,5,2],[1,1,2,3,4,2,3,4,5],
  [1,1,2,3,4,2,3,5,4],[1,1,2,3,4,2,4,3,5],[1,1,2,3,4,2,4,5,3],
  [1,1,2,3,4,2,5,3,4],[1,1,2,3,4,2,5,4,3],[1,1,2,3,4,3,2,4,5],
  [1,1,2,3,4,3,2,5,4],[1,1,2,3,4,3,4,2,5],[1,1,2,3,4,3,4,5,2],
  [1,1,2,3,4,3,5,2,4],[1,1,2,3,4,3,5,4,2],[1,1,2,3,4,4,2,3,5],
  [1,1,2,3,4,4,2,5,3],[1,1,2,3,4,4,3,2,5],[1,1,2,3,4,4,3,5,2],
  [1,1,2,3,4,4,5,2,3],[1,1,2,3,4,4,5,3,2],[1,1,2,3,4,5,2,3,4],
  [1,1,2,3,4,5,2,4,3],[1,1,2,3,4,5,3,2,4],[1,1,2,3,4,5,3,4,2],
  [1,1,2,3,4,5,4,2,3],[1,1,2,3,4,5,4,3,2],[1,1,2,3,4,2,3,5,5],
  [1,1,2,3,4,2,5,3,5],[1,1,2,3,4,2,5,5,3],[1,1,2,3,4,3,2,5,5],
  [1,1,2,3,4,3,5,2,5],[1,1,2,3,4,3,5,5,2],[1,1,2,3,4,5,2,3,5],
  [1,1,2,3,4,5,2,5,3],[1,1,2,3,4,5,3,2,5],[1,1,2,3,4,5,3,5,2],
  [1,1,2,3,4,5,5,2,3],[1,1,2,3,4,5,5,3,2],[1,1,2,3,2,4,4,5,5],
  [1,1,2,3,2,4,5,4,5],[1,1,2,3,2,4,5,5,4],[1,1,2,3,4,2,4,5,5],
  [1,1,2,3,4,2,5,4,5],[1,1,2,3,4,2,5,5,4],[1,1,2,3,4,4,2,5,5],
  [1,1,2,3,4,4,5,2,5],[1,1,2,3,4,4,5,5,2],[1,1,2,3,4,5,2,4,5],
  [1,1,2,3,4,5,2,5,4],[1,1,2,3,4,5,4,2,5],[1,1,2,3,4,5,4,5,2],
  [1,1,2,3,4,5,5,2,4],[1,1,2,3,4,5,5,4,2],[1,1,2,3,3,4,4,5,5],
  [1,1,2,3,3,4,5,4,5],[1,1,2,3,3,4,5,5,4],[1,1,2,3,4,3,4,5,5],
  [1,1,2,3,4,3,5,4,5],[1,1,2,3,4,3,5,5,4],[1,1,2,3,4,4,3,5,5],
  [1,1,2,3,4,4,5,3,5],[1,1,2,3,4,4,5,5,3],[1,1,2,3,4,5,3,4,5],
  [1,1,2,3,4,5,3,5,4],[1,1,2,3,4,5,4,3,5],[1,1,2,3,4,5,4,5,3],
  [1,1,2,3,4,5,5,3,4],[1,1,2,3,4,5,5,4,3],[1,2,1,2,3,3,4,4,5],
  [1,2,1,2,3,3,4,5,4],[1,2,1,2,3,3,4,5,5],[1,2,1,2,3,4,3,4,5],
  [1,2,1,2,3,4,3,5,4],[1,2,1,2,3,4,4,3,5],[1,2,1,2,3,4,4,5,3],
  [1,2,1,2,3,4,5,3,4],[1,2,1,2,3,4,5,4,3],[1,2,1,2,3,4,3,5,5],
  [1,2,1,2,3,4,5,3,5],[1,2,1,2,3,4,5,5,3],[1,2,1,2,3,4,4,5,5],
  [1,2,1,2,3,4,5,4,5],[1,2,1,2,3,4,5,5,4],[1,2,1,3,2,3,4,4,5],
  [1,2,1,3,2,3,4,5,4],[1,2,1,3,2,3,4,5,5],[1,2,1,3,2,4,3,4,5],
  [1,2,1,3,2,4,3,5,4],[1,2,1,3,2,4,4,3,5],[1,2,1,3,2,4,4,5,3],
  [1,2,1,3,2,4,5,3,4],[1,2,1,3,2,4,5,4,3],[1,2,1,3,2,4,3,5,5],

[1,2,1,3,2,4,5,3,5],[1,2,1,3,2,4,5,5,3],[1,2,1,3,3,2,4,4,5],
[1,2,1,3,3,2,4,5,4],[1,2,1,3,3,2,4,5,5],[1,2,1,3,3,4,2,4,5],
[1,2,1,3,3,4,2,5,4],[1,2,1,3,3,4,4,2,5],[1,2,1,3,3,4,4,5,2],
[1,2,1,3,3,4,5,2,4],[1,2,1,3,3,4,5,4,2],[1,2,1,3,3,4,2,5,5],
[1,2,1,3,3,4,5,2,5],[1,2,1,3,3,4,5,5,2],[1,2,1,3,4,2,3,4,5],
[1,2,1,3,4,2,3,5,4],[1,2,1,3,4,2,4,3,5],[1,2,1,3,4,2,4,5,3],
[1,2,1,3,4,2,5,3,4],[1,2,1,3,4,2,5,4,3],[1,2,1,3,4,3,2,4,5],
[1,2,1,3,4,3,2,5,4],[1,2,1,3,4,3,4,2,5],[1,2,1,3,4,3,4,5,2],
[1,2,1,3,4,3,5,2,4],[1,2,1,3,4,3,5,4,2],[1,2,1,3,4,4,2,3,5],
[1,2,1,3,4,4,2,5,3],[1,2,1,3,4,4,3,2,5],[1,2,1,3,4,4,3,5,2],
[1,2,1,3,4,4,5,2,3],[1,2,1,3,4,4,5,3,2],[1,2,1,3,4,5,2,3,4],
[1,2,1,3,4,5,2,4,3],[1,2,1,3,4,5,3,2,4],[1,2,1,3,4,5,3,4,2],
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[1,2,1,3,4,2,5,3,5],[1,2,1,3,4,2,5,5,3],[1,2,1,3,4,3,2,5,5],
[1,2,1,3,4,3,5,2,5],[1,2,1,3,4,3,5,5,2],[1,2,1,3,4,5,2,3,5],
[1,2,1,3,4,5,2,5,3],[1,2,1,3,4,5,3,2,5],[1,2,1,3,4,5,3,5,2],
[1,2,1,3,4,5,5,2,3],[1,2,1,3,4,5,5,3,2],[1,2,1,3,2,4,4,5,5],
[1,2,1,3,2,4,5,4,5],[1,2,1,3,2,4,5,5,4],[1,2,1,3,4,2,4,5,5],
[1,2,1,3,4,2,5,4,5],[1,2,1,3,4,2,5,5,4],[1,2,1,3,4,4,2,5,5],
[1,2,1,3,4,4,5,2,5],[1,2,1,3,4,4,5,5,2],[1,2,1,3,4,5,2,4,5],
[1,2,1,3,4,5,2,5,4],[1,2,1,3,4,5,4,2,5],[1,2,1,3,4,5,4,5,2],
[1,2,1,3,4,5,5,2,4],[1,2,1,3,4,5,5,4,2],[1,2,2,1,3,3,4,4,5],
[1,2,2,1,3,3,4,5,4],[1,2,2,1,3,3,4,5,5],[1,2,2,1,3,4,3,4,5],
[1,2,2,1,3,4,3,5,4],[1,2,2,1,3,4,4,3,5],[1,2,2,1,3,4,4,5,3],
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[1,2,2,1,3,4,5,4,5],[1,2,2,1,3,4,5,5,4],[1,2,2,3,1,3,4,4,5],
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[1,2,2,3,4,3,5,1,4],[1,2,2,3,4,3,5,4,1],[1,2,2,3,4,4,1,3,5],
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Parts of Tcontexture (9, 6)

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