Designing with L-Systems, Part 7: T-Sequence Models

The last article on L-Systems [1] showed how terminal L-Systems can be used to characterize t-sequences in terms of t-sequence expressions.

A t-sequence expression with undefined variables represents all the possible t-sequences that can be produced by giving all possible values to the undefined variables during interpretation.

The usefulness of this idea is illustrated by the following examples.

Example 1

seed: S

rules: S → pal(T)
T → motif(X,V)
X → hor(Y)
Y → motif(U,V))

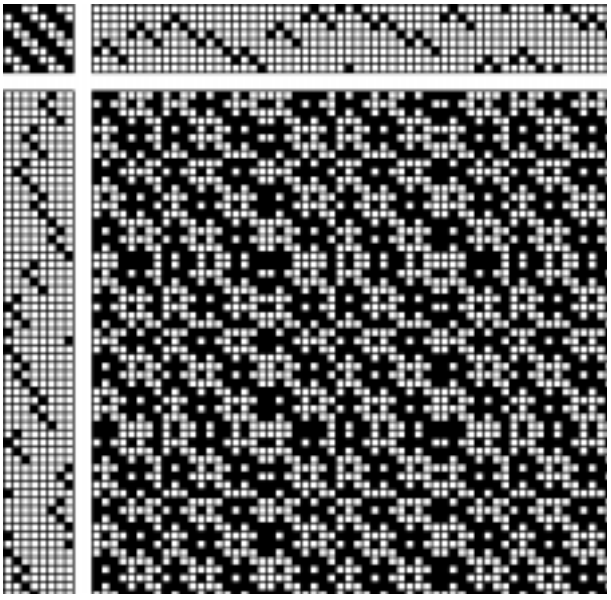
The terminal generation is

pal(motif(hor(motif(U,V)),V))

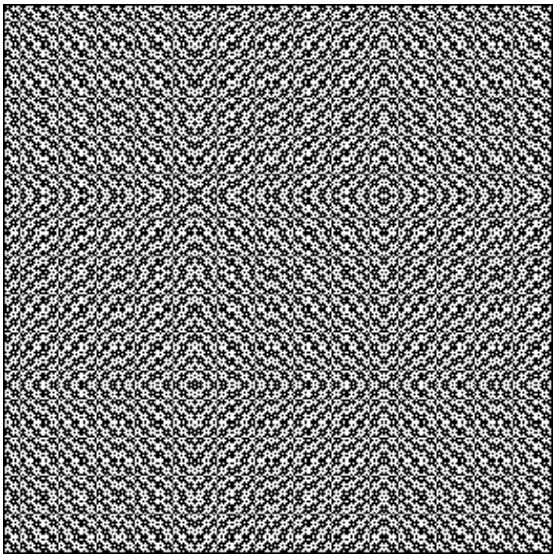
Given the values

U := [1,2,3,2]
V := [1,3, 5, 4, 2]

a draft based on the resulting sequence is:



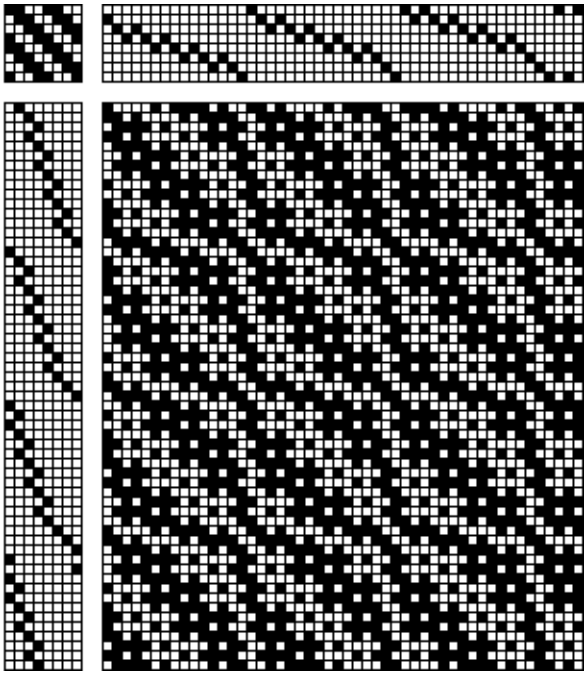
Here is the weave pattern:



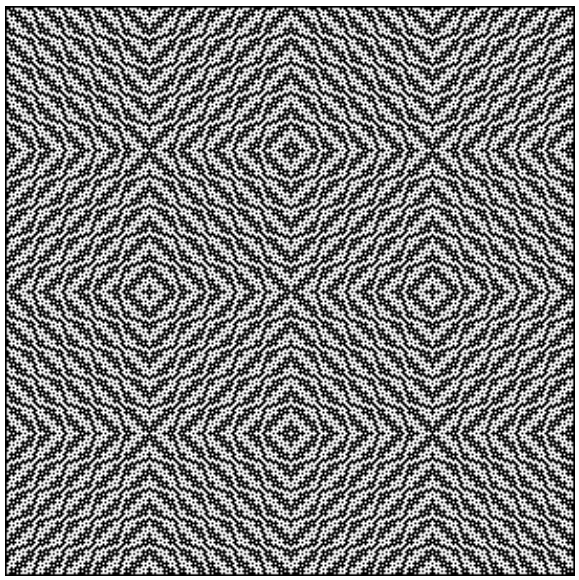
On the other hand, given the values

U := [1,2,3]
V := [1,2,3,4,5]

a draft based on the resulting sequence is:



Here is the weave pattern:



Example 2

seed: S

rules: S → pal(T)
T → coll(U,V)
U → pal(X)
V → pal(Y)

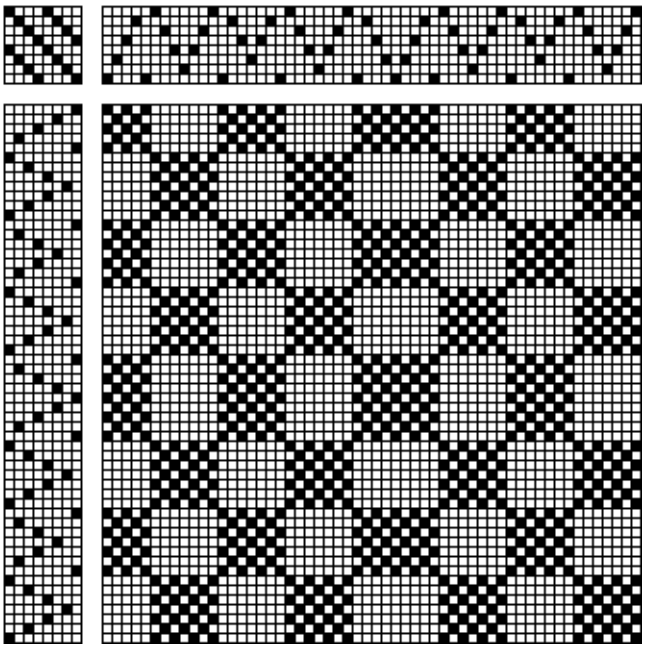
The terminal generation is

pal(coll(pal(X),pal(Y)))

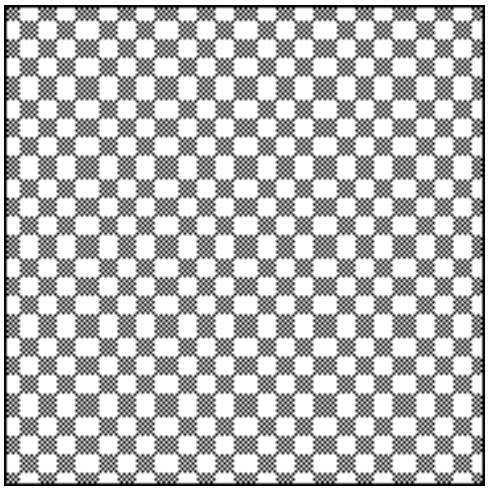
Given the values

X := [1,3,5,7,9,8,6,4,2]
Y := [6,4,2,7,5,3]

a draft based on the resulting sequence is:



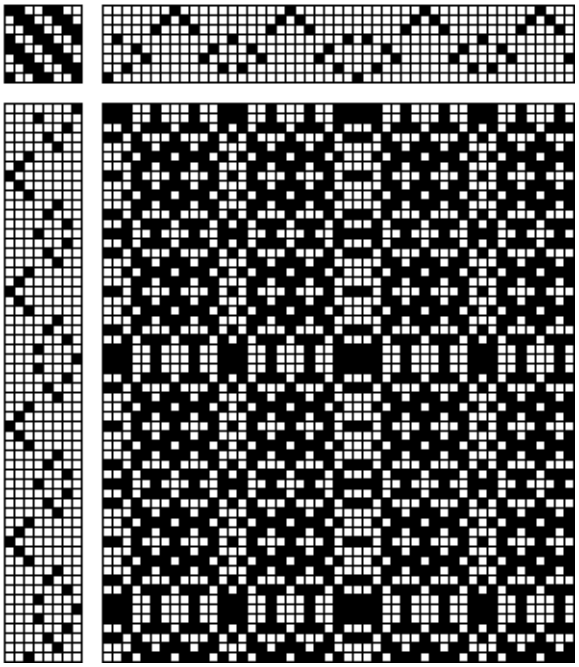
Here is the weave pattern:



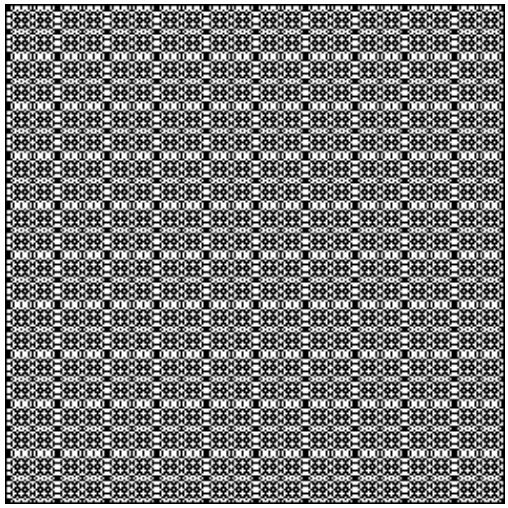
On the other hand, given the values

X := [1,5,2,4,3,6,7,8]
Y := [6,4,2,7,5,3]

a draft based on the resulting sequence is:



Here is the weaving pattern:



Of course, just for these two example L-Systems, there is an infinite number of sequences, not to mention bow they are used in drafts.

Reference

1. *Designing with L-Systems, Part 6: Generating T-Sequence Expressions*, 2004: http://cs.arizona.edu/patterns/weaving/webdocs/gre_ls06.pdf

Ralph E. Griswold
Department of Computer Science
The University of Arizona
Tucson, Arizona