

Designing with L-Systems, Part 10: Profile Drafts

Previous articles in this series have dealt with some esoteric uses of L-Systems for weave design [1-3]. But the simplest, easiest, and most straightforward use is for designing profile drafts, interpreting the strings generated by an L-System as profile sequences.

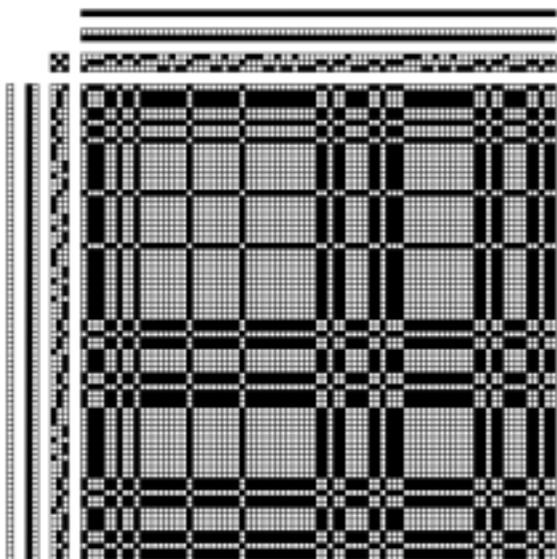
Here is an example:

seed: A
 rules: A → ABB
 B → BCC
 C → CAA

The first four generations are

	<i>generation</i>
ABB	1
ABBCCBCC	2
ABBCCBCCBCCCAACAABCCCAACAA	3
ABBCCBCCBCCCAACAABCCCAACAA... BCCCAACAACAABBABBCCAABBAB... BCCCAACAACAABBABBCCAABBABB	4

Any of these generations beyond the trivial one can be used for profile “threading” and “treading” sequences. From here on out, we’ll drop the quotes. Here is a draft that uses generation 4 for threading and treading:



Designing L-Systems for Profile Drafting

The number of blocks is, of course, the number of symbols for which there are replacement rules. By the nature of L-Systems, useful ones for profile drafting are limited to four or five blocks; otherwise the generated strings quickly get too long.

In designing L-systems for profile drafts, the distinguishing characteristic is the repetition of blocks to create varying pattern widths. A profile sequence without block repetitions is, of course, possible, but it is indistinguishable from a treading sequence, and has limited utility for profile design.

Block repetition is easy to build into L-Systems. The problem is more one of avoiding excessively long generation strings. See the preceding example, which has only three symbols. In this L-System, every generation is three times as long as the preceding one: 3, 9, 27, 81, 243, ... Since profile drafts are the source of threading drafts with more than one thread per block, the limitations are clear.

Another consideration is symmetry. Palindromic mirroring is a powerful tool for producing attractive, even compelling patterns. Palindromes can be added after the fact, but they can be designed into L-System by the simple expedient of making all the rules palindromic. Here is an example:

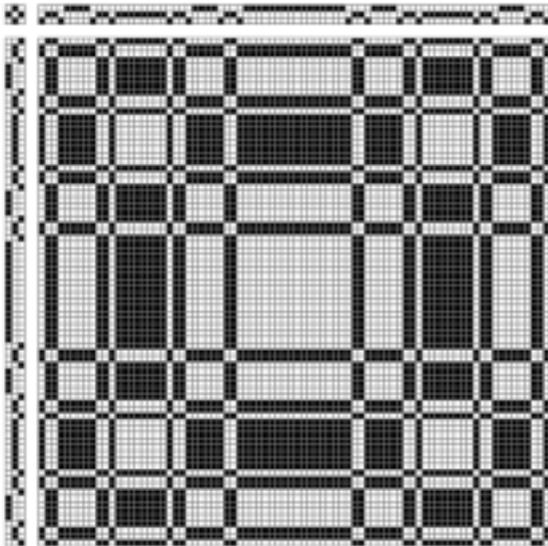
seed: A
 rules: A → ABBA
 B → CC
 C → BB

The generations are

	<i>generation</i>
ABBA	1
ABBACCCABBA	2
ABBACCCABBABBBBBBBBABBA... CCCABBA	3
ABBACCCABBABBBBBBBBABBA... CCCABBACCCCCCCCCCCC...	

CCABBACCCCABBABBBBBBBBA...
BBACCCABBA 4

A profile draft for generation 4 is



Other Ideas

There is a wealth of ways that profile drafts can be produced from L-Systems.

One idea is to use one L-System for the threading and another for the treadling.

Remember that interpretation is a very powerful tool when using L-Systems. Among the many possibilities is the use of a width sequence to replicate each successive block in a string by some number of times.

You can think of many other possibilities.

References

1. *Designing with L-Systems, Part 6: Generating T-Sequence Expressions*, Ralph E. Griswold, 2004:
http://www.cs.arizona.edu/patterns/weaving/webdocs/gre_ls06.pdf
2. *Designing with L-Systems, Part 7: T-Sequence Models*, Ralph E. Griswold, 2004:
http://www.cs.arizona.edu/patterns/weaving/webdocs/gre_ls07.pdf
3. *Designing with L-Systems, Part 9: Devious Interpretation*, Ralph E. Griswold, 2004:
http://www.cs.arizona.edu/patterns/weaving/webdocs/gre_ls09.pdf

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