L-System Design, Part 5: “Stalks” and “Foliage”

Previous articles in this series [1-4] have dealt with various aspects of designing L-Systems. This article deals with a way of designing L-Systems in which the appearance of symbols and the strings they generate can be delayed.

Delay Chains

A delay chain is a set of rules that simply lead from one to another without involving the other symbols of the L-System.

Here is an example of an L-System with a delay chain:

seed: ARB

rules:
A → AB
B → BA
R → S
S → C
C → CDC
D → DCD

The generations are

ARB
ABSBA
ABSBA
ABBACBAAB
ABBABAABCDCBAABABBA
ABBABAABBAABABBACDCDCDCDC…
BAABABBAABBABAAB
…

The symbols R and S delay the introduction of C until the third generation. From this point on, C and D develop their own pattern.

Delay chains can be viewed as “’stalks” that proceed down through generations, while the other parts of the generations can be viewed as “foliage”.

The L-System above is a Fibonacci string L-System [3] with Fibonacci foliage on either side of a central stalk that leads to palindromic foliage.

If the rule

S → C

is replaced by

S → RCR

then two stalks on either side of the palindromic foliage are introduced.

An L-System can have more than one kind of stalk. For example, if the rule

S → C

is replaced by

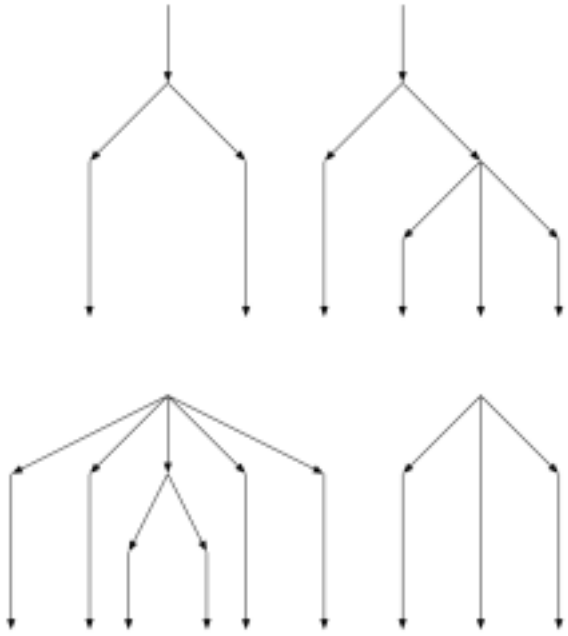
S → VCV

and the rules

V → W
W → X
X → A

are added, the Fibonacci part of the L-System is introduced again three generations down.

The diagrams below suggest other possible stalk layouts.



References

1. *L-System Design, Part 1: Introduction*, Ralph E. Griswold, 2005:
http://www.cs.arizona.edu/patterns/weaving/webdocs/gre_lsd1.pdf
1. *L-System Design, Part 2: Generation Length*, Ralph E. Griswold, 2005:
http://www.cs.arizona.edu/patterns/weaving/webdocs/gre_lsd2.pdf
1. *L-System Design, Part 3: Expressive Power*, Ralph E. Griswold, 2005:
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1. *L-System Design, Part 4: Symbol Relationships*, Ralph E. Griswold, 2005:
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