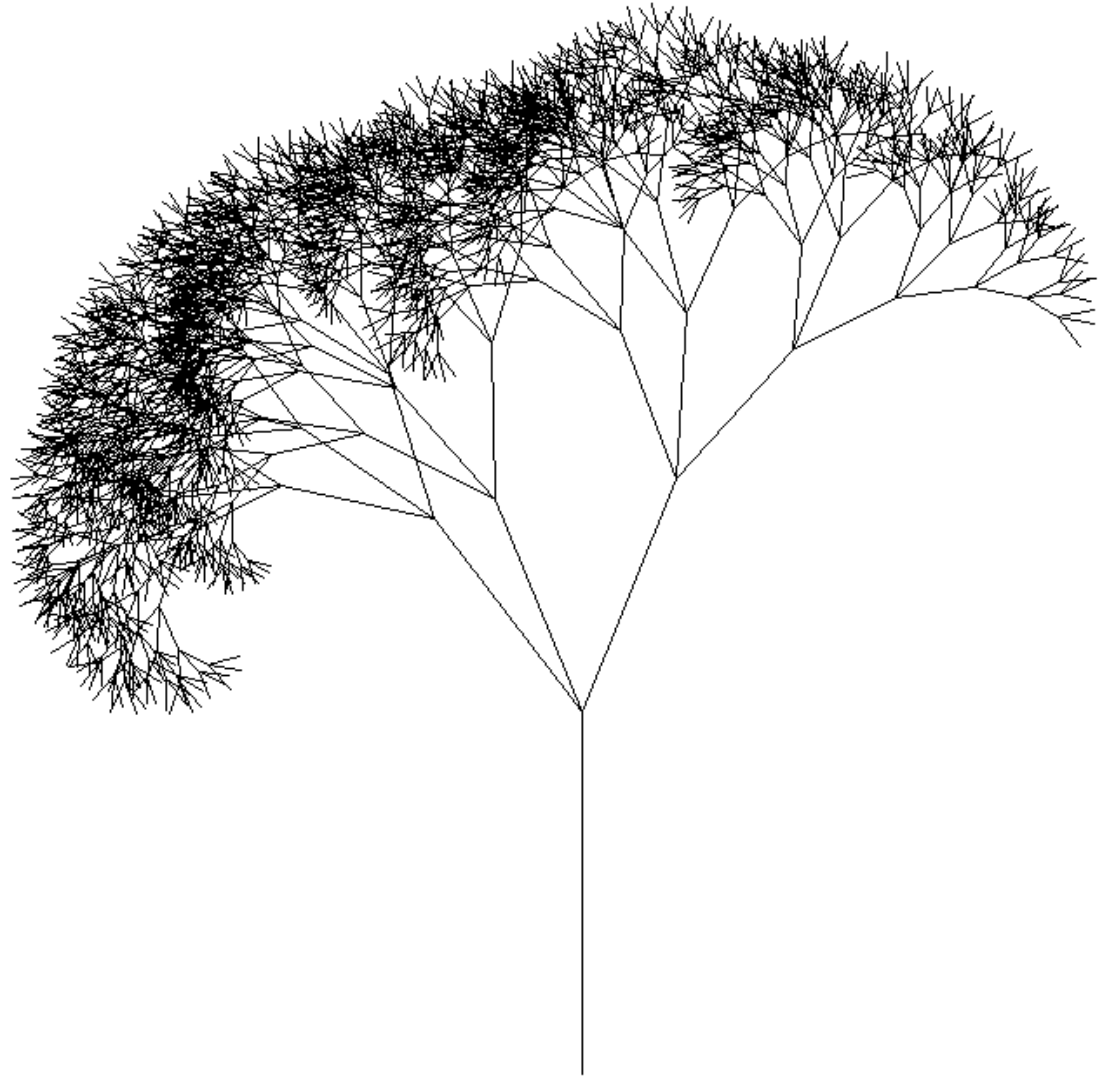


L-Systems

- Formal models of plant or cellular growth
- Axioms and rules
- Turtle graphics commands



L-Systems: A Simple Example

- Axiom: A

- Rules:

(1) $A \rightarrow B$

(2) $B \rightarrow AB$

L-Systems: A Simple Example

- Axiom: A

- Rules:

(1) $A \rightarrow B$

(2) $B \rightarrow AB$

A

length = 1

L-Systems: A Simple Example

- Axiom: A

- Rules:

(1) $A \rightarrow B$

(2) $B \rightarrow AB$

A

B

length = 1

length = 1

L-Systems: A Simple Example

- Axiom: A

- Rules:

(1) $A \rightarrow B$

(2) $B \rightarrow AB$

A

length = 1

B

length = 1

AB

length = 2

L-Systems: A Simple Example

- Axiom: A

- Rules:

(1) $A \rightarrow B$

(2) $B \rightarrow AB$

A	length = 1
B	length = 1
AB	length = 2
B AB	length = 3

L-Systems: A Simple Example

- Axiom: A

- Rules:

(1) $A \rightarrow B$

(2) $B \rightarrow AB$

A	length = 1
B	length = 1
AB	length = 2
BAB	length = 3
ABBAB	length = 5

L-Systems: A Simple Example

- Axiom: A

- Rules:

(1) $A \rightarrow B$

(2) $B \rightarrow AB$

A	length = 1
B	length = 1
AB	length = 2
BAB	length = 3
ABBAB	length = 5
B ABAB B AB	length = 8

L-Systems: A Simple Example

- Axiom: A

- Rules:

(1) $A \rightarrow B$

(2) $B \rightarrow AB$

A	length = 1
B	length = 1
AB	length = 2
BAB	length = 3
ABBAB	length = 5
BABABBAB	length = 8
ABBABBABBAB	length = 13

L-Systems: A Simple Example

- Axiom: A

- Rules:

(1) $A \rightarrow B$

(2) $B \rightarrow AB$

A	length = 1
B	length = 1
AB	length = 2
BAB	length = 3
ABBAB	length = 5
BABABBAB	length = 8
ABBABBABABBAB	length = 13
...	

Fibonacci sequence

Your Turn

- Axiom: A
- Rules:
 - (1) $A \rightarrow ABA$
 - (2) $B \rightarrow BBB$

Start with:

A

Apply the rules 3 times to generate 3 new strings ...

Your Turn

- Axiom: A
- Rules:
 - (1) $A \rightarrow ABA$
 - (2) $B \rightarrow BBB$

Start with:

A

ABA

ABABBBABA

ABABBBABABBBBBBBBBBABABBBABA

— — — — — — — — — —

Interpretation:

A = —

B = blank

Another Example

- Axiom: F
- Rule: $F \rightarrow F-F+F+F+F-F-F-F+F$

F

$F-F+F+F+F-F-F-F+F$

$F-F+F+F+F-F-F-F+F-F-F+F+F+F-F-F-F+F+F+F+F-F-F-$
 $F-F+F+F-F+F+F+F-F-F-F+F+F+F-F+F+F+F-F-F-F+F-F-$
 $F+F+F+F-F-F-F+F-F-F-F+F+F+F-F-F-F+F-F-F+F+F+F-F-F-$
 $F+F+F-F+F+F+F-F-F-F+F$

...

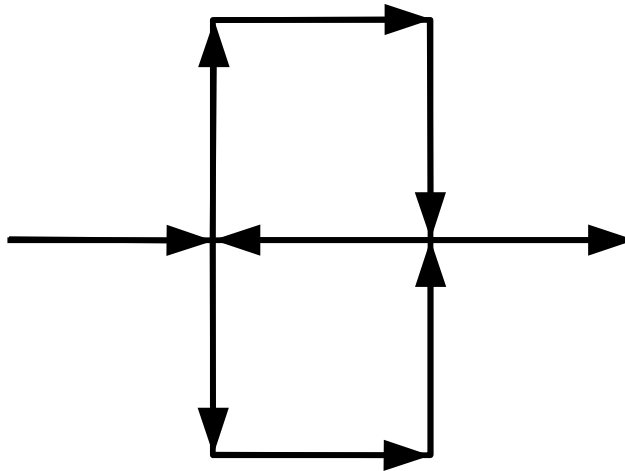
Interpretation

F = “move forward”

– = “turn left 90 degrees”

+ = “turn right 90 degrees”

F–F+F+F+F–F–F–F+F



Interpretation

F = “move forward”

– = “turn left 90 degrees”

+ = “turn right 90 degrees”

F–F+F+F–F–F–F+F–F–F+F+F–F–F–F+F+F–F+F+F–F–F–F+F+F–F+F+F+F–
F–F–F+F+F–F+F+F+F–F–F–F+F–F–F+F+F–F–F–F+F–F–F+F+F–F–F–F+F–F–
F+F+F+F–F–F–F+F+F–F+F+F+F–F–F–F+F

