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MA-INF 4201 - Artificial Life
Exercise Sheet 4

Assignment 24

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Assignment 25

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Assignment 26

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Assignment 27

Let "|" be the concatenation of words. Then we have the following recursion for the L-system from the example:

$$w_0 = C, w_1 = A$$
$$w_n = w_{n-2}|w_{n-1}$$
$$|w_n| = |w_{n-2}| + |w_{n-1}|$$

which is the recursion formula of the Fibonacci numbers ($|w_0| = |w_1| = 1$).

Proof of the recursion by induction:

Induction start: $n = 2$; $w_2 = w_0|w_1 = C|A = CA$

Induction step: $n \to n+1$; Using the induction hypothesis we conclude: $w_{n+1} = w_{(n+1)-2}|w_{(n+1)-1} = w_{n-1}|w_n$

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Assignment 28

variables: R, S, T
axiom: R

rule 1: $R \to RS$
rule 2: $S \to ST$
rule 3: $T \to TR$

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Assignment 29

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Assignment 30

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