

Context Free Grammars

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Continued

$G = (V, \Sigma, R, S)$ where - V a finite set called the set of variables - Σ a finite set of characters - $S \in V$ start variables - R is a set of rules $A \rightarrow$ string of variables and/or letters from Σ

Rules

supp. rule $A \rightarrow 0A1$ And if $w1 = 01A11 \implies w2 = 010A111$ where $w2$ is derived from $w1$.

Also,

$w1 \implies w2 \implies w3 \implies w4 \implies \dots \implies wn$

Then $w1 \overset{*}{\implies} wn$

Given a CFG $G(= (V, \Sigma, R, S))$, then the language generated by it is $LG = \{ w \mid w \in \Sigma \text{ and } S \overset{*}{\implies} w \}$

Example

In the previous case of the Grammar of arithmetic over add and sub, - Σ was $\{0\dots9, (,), +, -\}$ - V was $\{E, N\}$ - R was - $E \rightarrow E+E \mid E-E \mid (E) \mid N$ - $N \rightarrow 0 \mid \dots \mid 9 \mid NN$ - $S = E$

Parse Tree

Stack

FIFO - First in Last out. You push into the stack, but you must pop out the last element only.

