Context-free Grammars and Regular Languages

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Write a context free grammar for every rular language.

Every state is nothing but a rule. If δ(a,qi) = qj

then Ri $\rightarrow$ aRj

Rj $\rightarrow \epsilon$ if qj $\in$ F

And the Context free grammar is - V = {Rj} - $\Sigma = \Sigma$ - R given as above - S is R0

Contd.

Parse to check if Expr.

1. Initialise a Stack with $
2. Push S to a Stack
3. Branch and make stacks every possible rule
4. If left most element

Push Down automaton

Defn: It is a Tuple P = (Q, Σ, Γ, δ, q0, F) - Q is a finite set of "states" - Σ is a finite set called the alphabet - Γ is a finite set called the stack alphabet - q0 $\in$ Q is start state - F$\subseteq$Q - δ: Q $\times$ ($\Sigma \cup \{\epsilon\}$) $\times$ ($\Gamma \cup \{\epsilon\}$) $\rightarrow \mathcal{P}$(Q $\times$ ($\Gamma \cup \{\epsilon\}$)

Example

0N1N

Informal- 1. If read a zero, push to stack 2. If read a one, pop from stack 3. Accept if stack is empty

Formal

Build P = (Q, Σ, Γ, q0, F, δ)