

Pushdown Automata

Convert a CFG G into CNF

- Add a new start symbol
- Eliminate ϵ -productions
- Eliminate unit productions
- Eliminate useless symbols
- Convert rules into proper form
- Examples

Pushdown Automata (PDA)

- PDA: NFA with stack
- stack: unlimited storage, LIFO (last-in first-out)
 - push
 - pop
- nondeterministic
- Example: $\{0^n 1^n\}$
- Picture representation

Formal Definition of PDA

- A PDA is a 6-tuple $M = (Q, \Sigma, \Gamma, \delta, q_0, F)$ where
 - Q : finite set of states
 - Σ : finite input alphabet
 - Γ : finite stack alphabet
 - $\delta: Q \times \Sigma_\epsilon \times \Gamma_\epsilon \longrightarrow 2^{Q \times \Gamma_\epsilon}$
 - $q_0 \in Q$: start state
 - $F \subseteq Q$: set of accept states
- Example: $\delta(q, a, Z) = \{(p_1, r_1), (p_2, r_2), \dots, (p_n, r_n)\}$