4/14 (月) Left / Right Parsers

Let $G = (N, \Sigma, P, S)$ be a cfg.

Left Parser $M = (N \cup \Sigma, \Gamma, P, \tau, S, \{\varepsilon\})$

$\forall A \to \alpha \in P$: $A| \to \alpha^R| \in \Gamma$, $\tau(A| \to \alpha^R|) = A \to \alpha$

$\forall a \in \Sigma$: $a|a \to \ | \in \Gamma$, $\tau(a|a) = \varepsilon$

$S \overset{\pi_\ell}{\underset{lm}{\Rightarrow}} w$ iff $\$S|w\$ \overset{\theta_\ell}{\Rightarrow} \$|\$$, $\pi_\ell \in P^*$, $\theta_\ell \in \Gamma^*$

where $\tau(\theta_\ell) = \pi_\ell$, $|\pi_\ell| + |w| = |\theta_\ell|$

Parse Tree → Top-Down → Bottom Up

deterministic

LL(k) Parser

- (L)eft-to-right Scan
- in (L)eftmost derivation (in Normal Order)
- using (k) lookahead symbols

Right Parser $M = (N \cup \Sigma, \Gamma, P, \tau, \varepsilon, \{S\})$

$\forall a \in \Sigma$: $|a \to a| \in \Gamma$, $\tau(|a \to a|) = \varepsilon$

$\alpha| \to A| \in \Gamma$ (handle), $\tau(\alpha| \to A|) = A \to \alpha$

$S \overset{\pi_r}{\underset{rm}{\Rightarrow}} w$ iff $\$|w\$ \overset{\theta_r}{\Rightarrow} \$S|\$$

where $\tau(\theta_r) = \pi_r^{(R)}$, $\pi_r \in P^*$, $\theta_r \in \Gamma^*$, $|\pi_r| + |w| = |\theta_r|$

$\tau(\theta_r) = \pi_r^R$ (Bottom Up)

deterministic

LR(k) Parser

- (L)eft-to-right Scan
- in (R)ightmost derivation in Reversed Order
- using (k) lookahead symbols

RL(k)

RR(k)