1) 10/17(木) 제 20 강 Deterministic Left/Right Parsers (1)

(총 28강 중 제 27, 8강 남음)

Review: Chap. 7. Useful grammar, X ε-rule, X unit rule → Chomsky's Normal Form (CNF for cfg)

$A \to BC$ or a except $S \to \varepsilon$.

CFG $A \to \alpha \in P$ $A \in N$, $\alpha \in (N \cup T)^*$.

$\xrightarrow{\text{normal form}}$ $A \to BC$ or $A \to a$, $A, B, C \in N$, $a \in T$

except $S \to \varepsilon$.

RG. $A \to xB$ or $A \to y \in P$ $A, B \in N$, $x, y \in T^*$

$\xrightarrow{\text{normal form}}$ $A \to aB$ or $b \in P$ $A, B \in N$ $a, b \in T$.

$\updownarrow$ ↑ Deterministic Reg. grammar

DFA / NFA $\delta: Q \times \Sigma \to 2^Q$ (or D) → If $A \to aB$, $A \to aC \in P$, then $B = C$.

XFA $\delta: Q \times \Sigma^* \to 2^Q$

대우명제 If $B \neq C$, then $A \to aB | aC \notin P$.

Pumping Lemma for CFL

$z = uvwxy$

i) First pump $|vwx| \le n$

ii) non-empty pumping $vx \neq \varepsilon$

iii) pumping $uv^iwx^iy \in L$, $\forall i \ge 0$.

Pumping Lemma for RL

$w = xyz$

i) $|xy| \le n$

ii) $y \neq \varepsilon$

iii) $xy^iz \in L$ $\forall i \ge 0$.

Closure properties of CFL's

union, Concatenation, Closure, Substitution, Reversal

X intersection But $CFL \cap RL \Rightarrow CFL$

⋮

Membership Problem

CYK $O(n^3)$

Left/Right NP $(O(2^n)!)$

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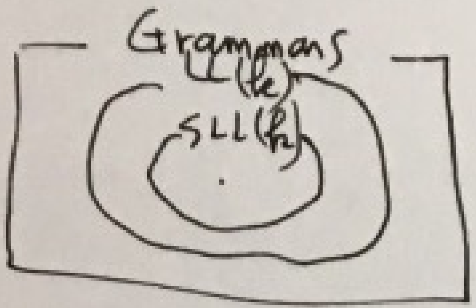
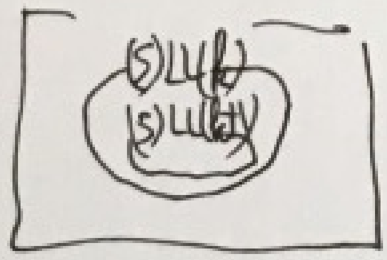
Chap 6-B Deterministic Left Parser.

SLL(k) ··· Strong Left-to-right scan in Leftmost derivation with k-lookahead symbols.

LL(k)





But SLL(1) = LL(1).

eft Parser

$(\varepsilon, A) \to (\varepsilon, \alpha)$ $\quad A \to \alpha \in P \qquad (a, a) \to (\varepsilon, \varepsilon) \quad a \in T.$

SLL(k) Parser

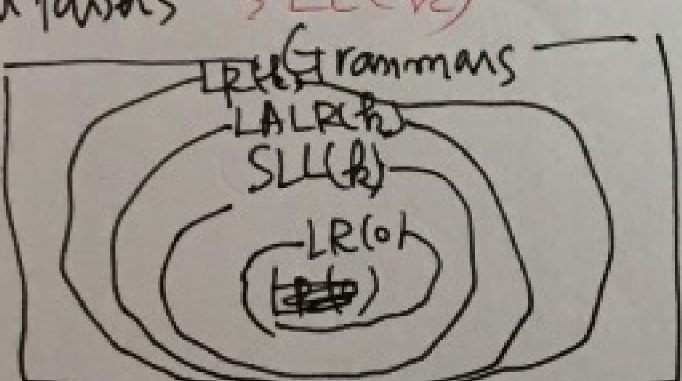
$(x, A) \to (x, \alpha)$ $\quad A \to \alpha \in P \qquad (a, a) \to (\varepsilon, \varepsilon) \quad a \in T$

i) $x \in First_k(\alpha)$

ii) Left recursion → right recursion

iii) $x \in First_k(\alpha) \oplus_k Follow(A) \qquad A \to \alpha \in P$

Right Parsers SLL(k)



$LR(0) \subsetneq SLL(k) \subsetneq LALR(k) \subsetneq LR(1)$

$SLL(k) \subset SLL(k+1)$

$LALR(k) \subset LALR(k+1)$

But $LR(1) = LR(k)$ ··· Knuth, 1965

"On the translation of languages from Left to Right"