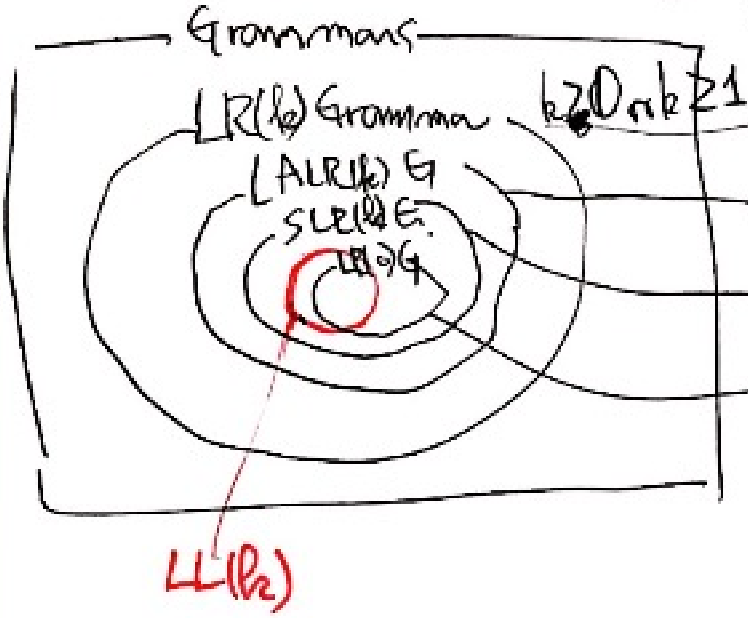
5/30 LR(0), SLR(k), LALR(k), and LR(k) Parsings

Deterministic

Right Parser

Nondeter.

(", ", ", and ") Grammar



if LR(k) parser is deterministic for G

LALR(k)

SLR(k)

LR(0)

G_{ab}: $S \to aA \mid bB$

$A \to c \mid dAd$ ($d^n c d^n$, $n \geq 0$)

$B \to c \mid dBc$

$[A \to \alpha . \beta, \varepsilon]$

($A \to \alpha\beta \in P$) ~~is~~ is LR(0)

core position

lookahead

LR(k) item: $[A \to \alpha . \beta, x]$ $A \to \alpha\beta \in P$, $x \in \Sigma^{\leq k} = \Sigma^0 \cup \Sigma^1 \cup \dots \cup \Sigma^k$

Let $G = (N, \Sigma, P, S)$ be a cfg. $M_k = (C_k, \underline{N \cup \Sigma}, P, q_s, \emptyset)$ — 생각하자 dfa

$M_{dfa} = (Q, \Sigma, P, q_0, F)$

set of LR(k) states (= set of LR(k) items)

argumenting rule

where $\$ \notin N \cup \Sigma$, $S' \to S\$ \notin P$, $S' \notin N$

$q_s := \partial_k^*(\{[S' \to .S\$, \varepsilon]\})$ ($\$^k$)

where $\partial_k(\{[A \to \alpha . B\beta, x]\})$

$= \{[B \to .\gamma, y] \mid B \to \gamma \in P, y \in First_k(\beta x)\}$

$C_k := \{q_s\}$; $P := \emptyset$

repeat

for $q \in C_k$ and $X \in N \cup \Sigma$ do

$p := \partial_k^*(\chi_k^X(q))$; where $\chi_k^X(\{[A \to \alpha . X\beta, y]\}) = \{[A \to \alpha X . \beta, y]\}$

$C_k := C_k \cup \{p\}$

$P := P \cup \{q \cdot X \Rightarrow_P p\}$

od

until C_k does not change (added!)

A, $\alpha . \beta$, x, β, $. \gamma$, $y \in First_k(\beta x)$

$k \geq 1$, ($= k > 0$)

LR(0)	SLR(k)	LALR(k)	LR(k)
LR(0) st	LR(0) state $2^{\lvert P \rvert}$		LR(k) state $2^{\lvert P \rvert \cdot \lvert \Sigma \rvert^k}$
states (shift/reduce) lookahead (reduce) × Σ	Follow(A) ↓ SLL(k) no state	LR(0) lookahead LR(k)	LR(k) lookahead ; lookahead LR(k) state LR(k)