



# SDT Part-1

Complete Course on Compiler Design



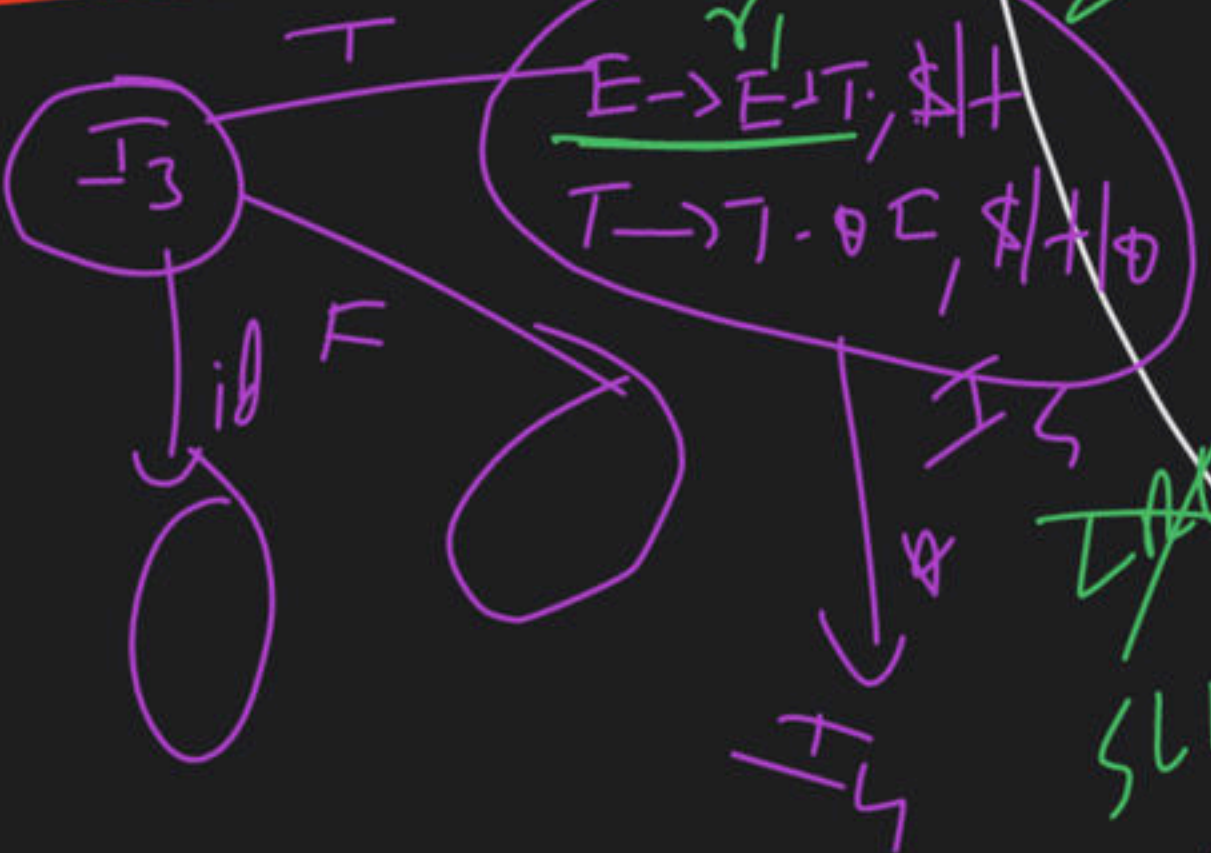
~~et~~

$E \rightarrow E + T / T$

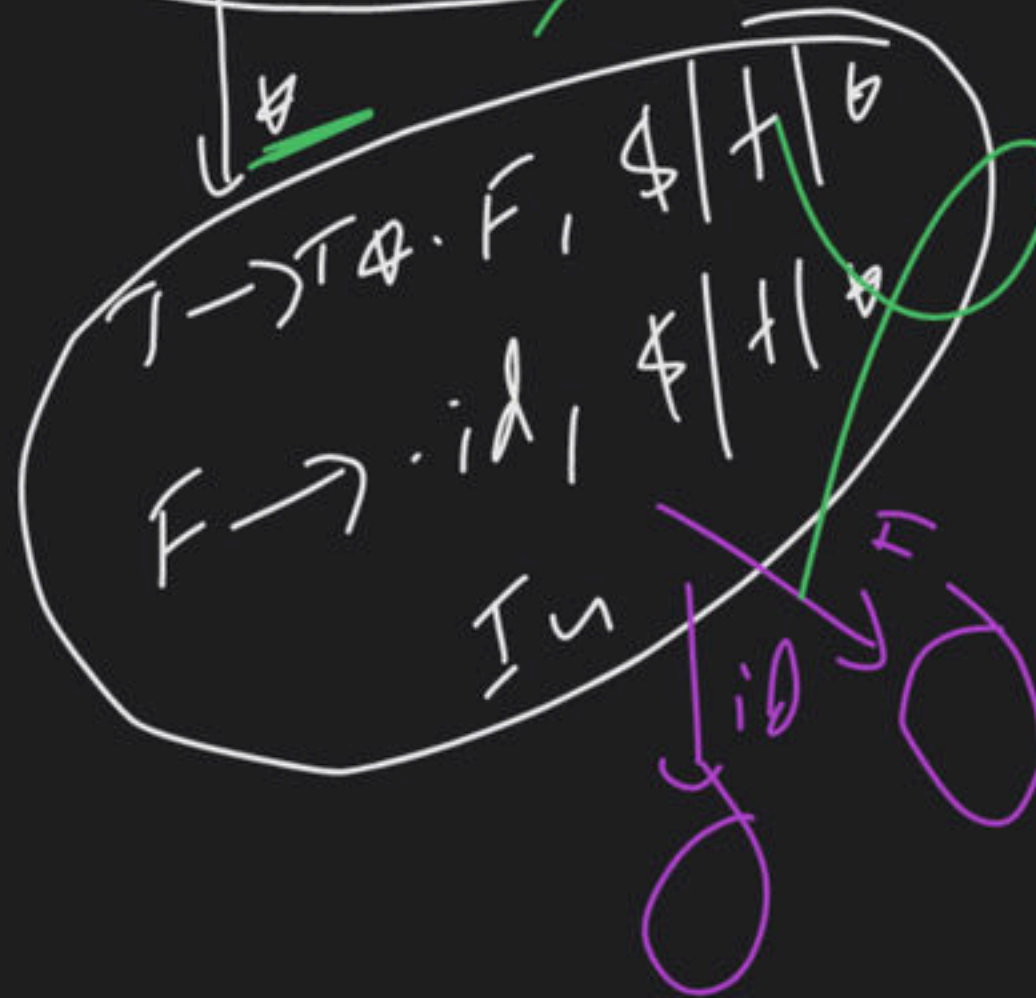
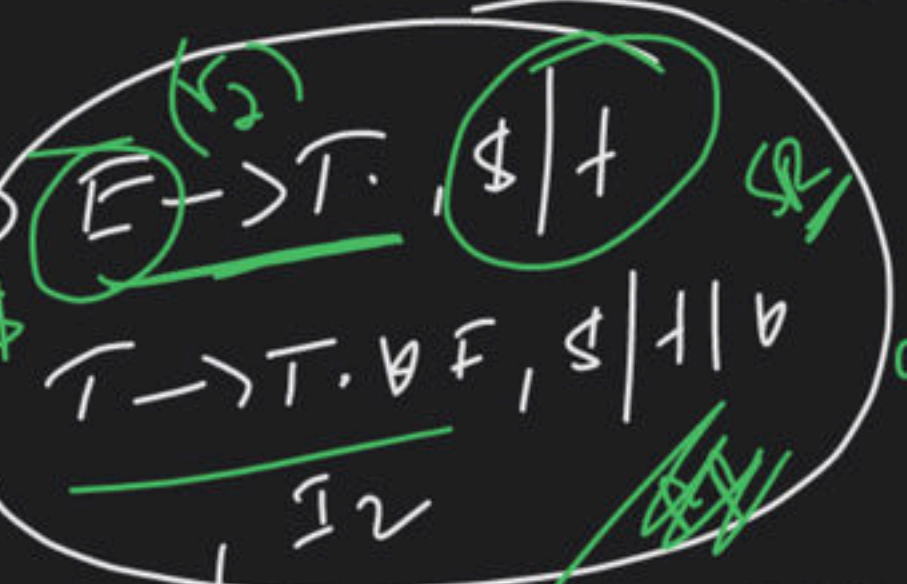
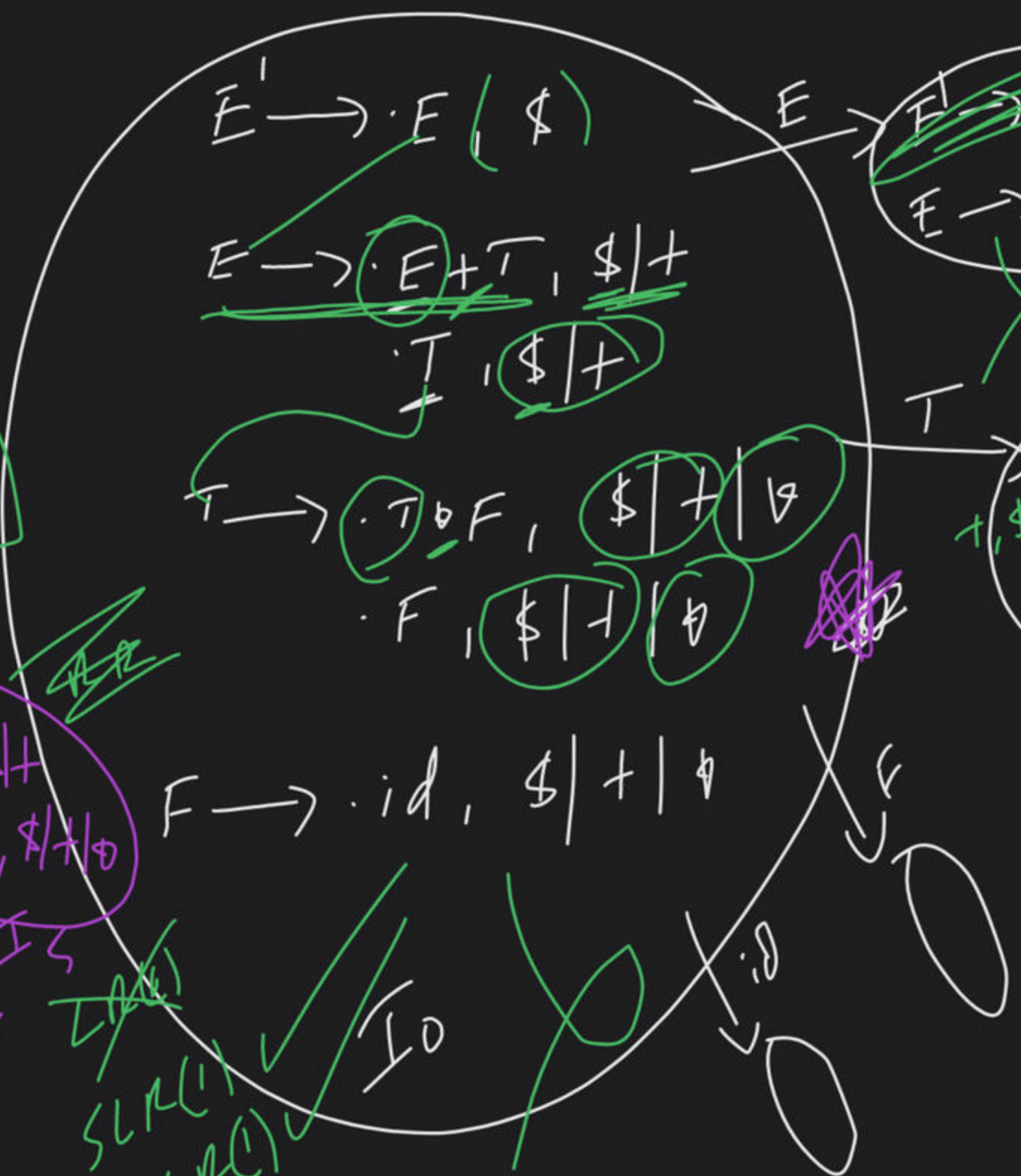
$T \rightarrow T \square / F$

$F \rightarrow id$

LALR(1)?



SLR(1)  
LALR(1)  
CLR(1)



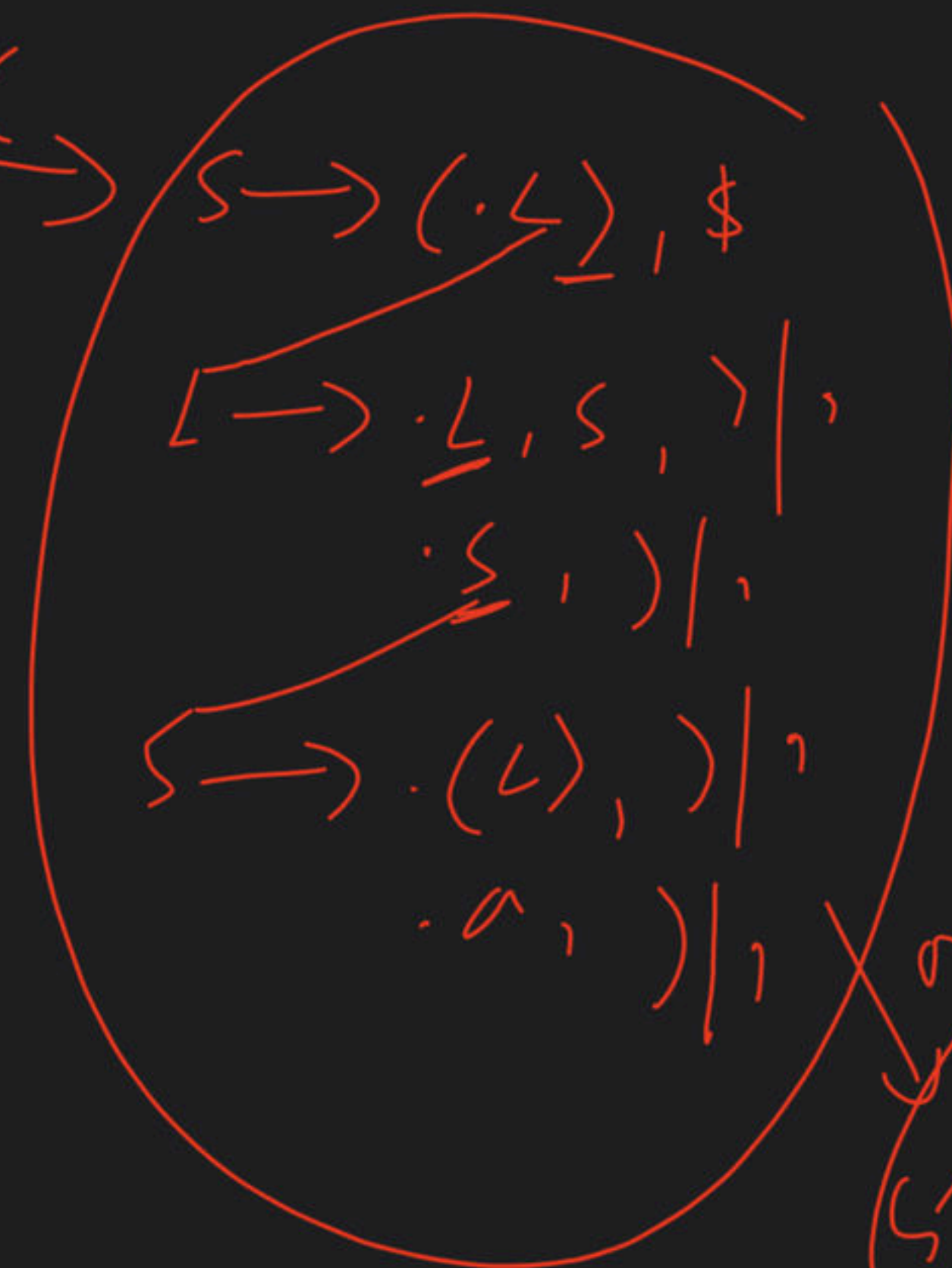
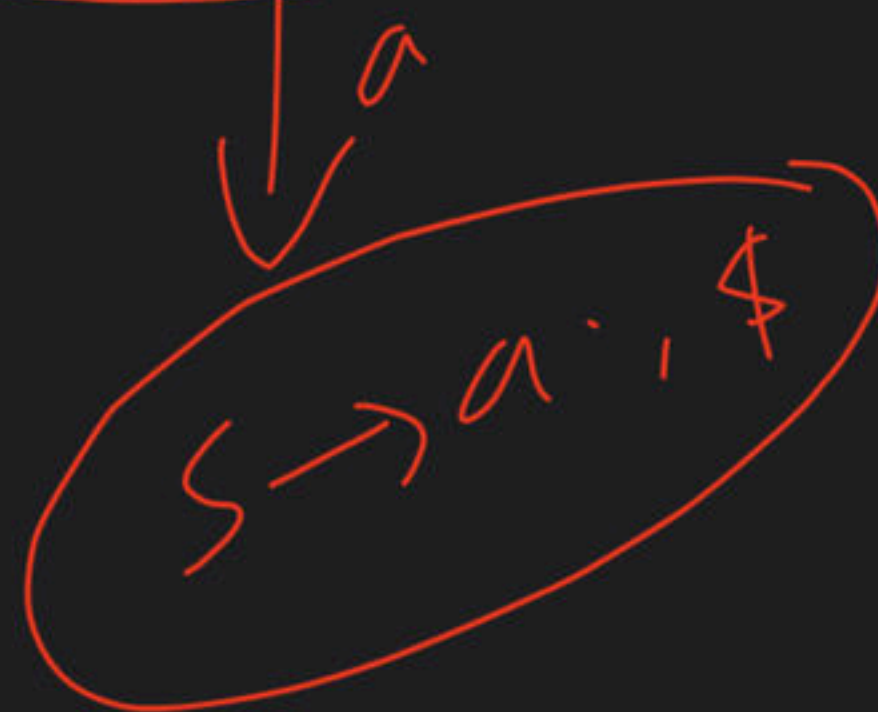
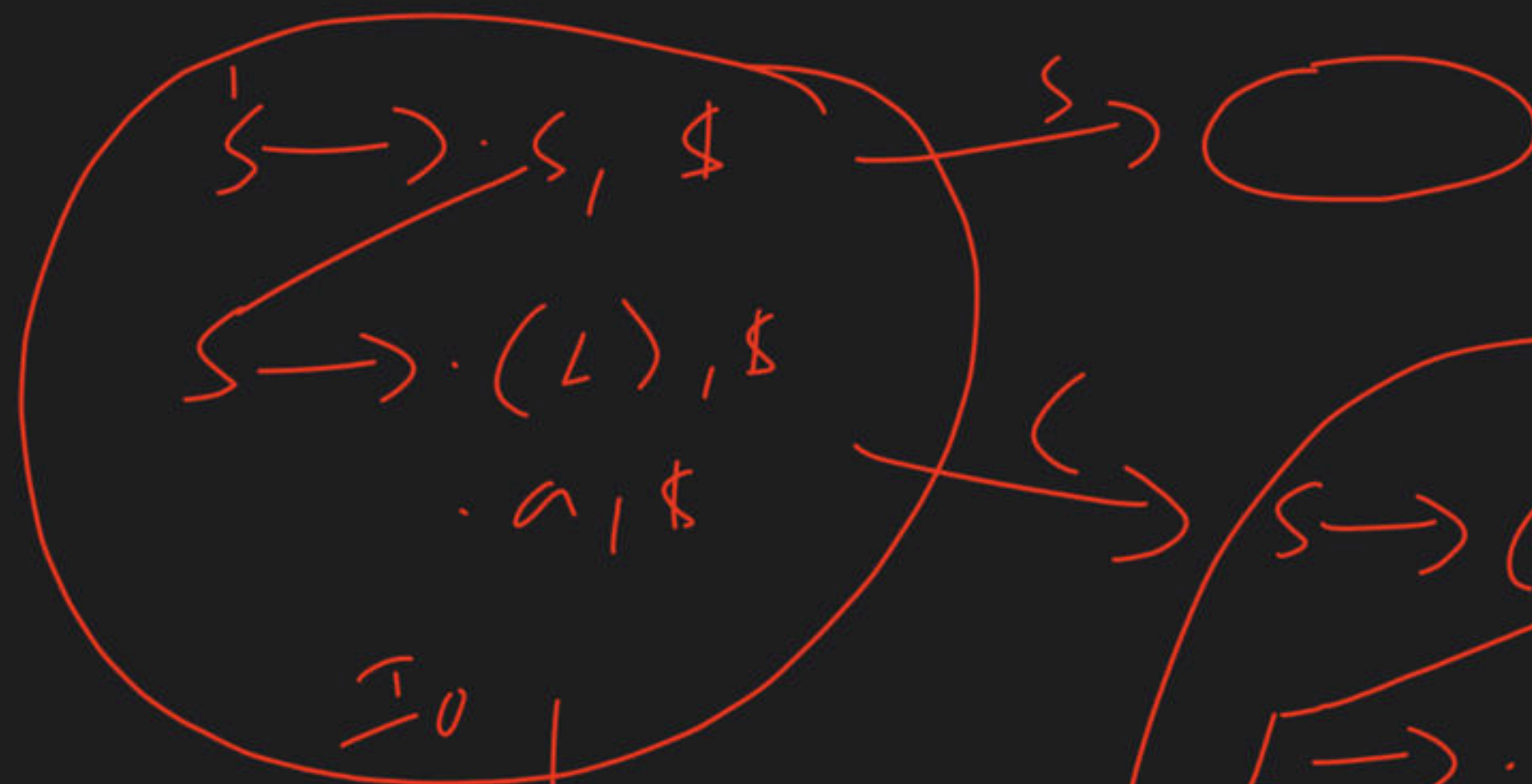
$E \rightarrow E + T, \$|+$   
 $T \rightarrow T \square F, \$|+|\square$   
 $F \rightarrow id, \$|+|\square$



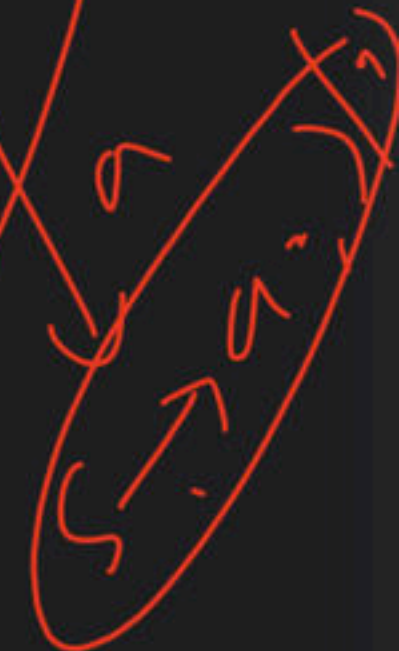
ex

$S \rightarrow (L) / a$

$L \rightarrow L, S / S$



$LALR(1) \neq CLR(1)$



~~$S \rightarrow a/b$~~

$S \rightarrow a/b$

LL(1) ✓

$S \rightarrow \underline{ab} / \underline{ac} / ad$

LL(1) ✗

LL(2) ✓

$S \rightarrow \underline{abc} / \underline{abd} / \underline{abe}$

LL(1) ✗

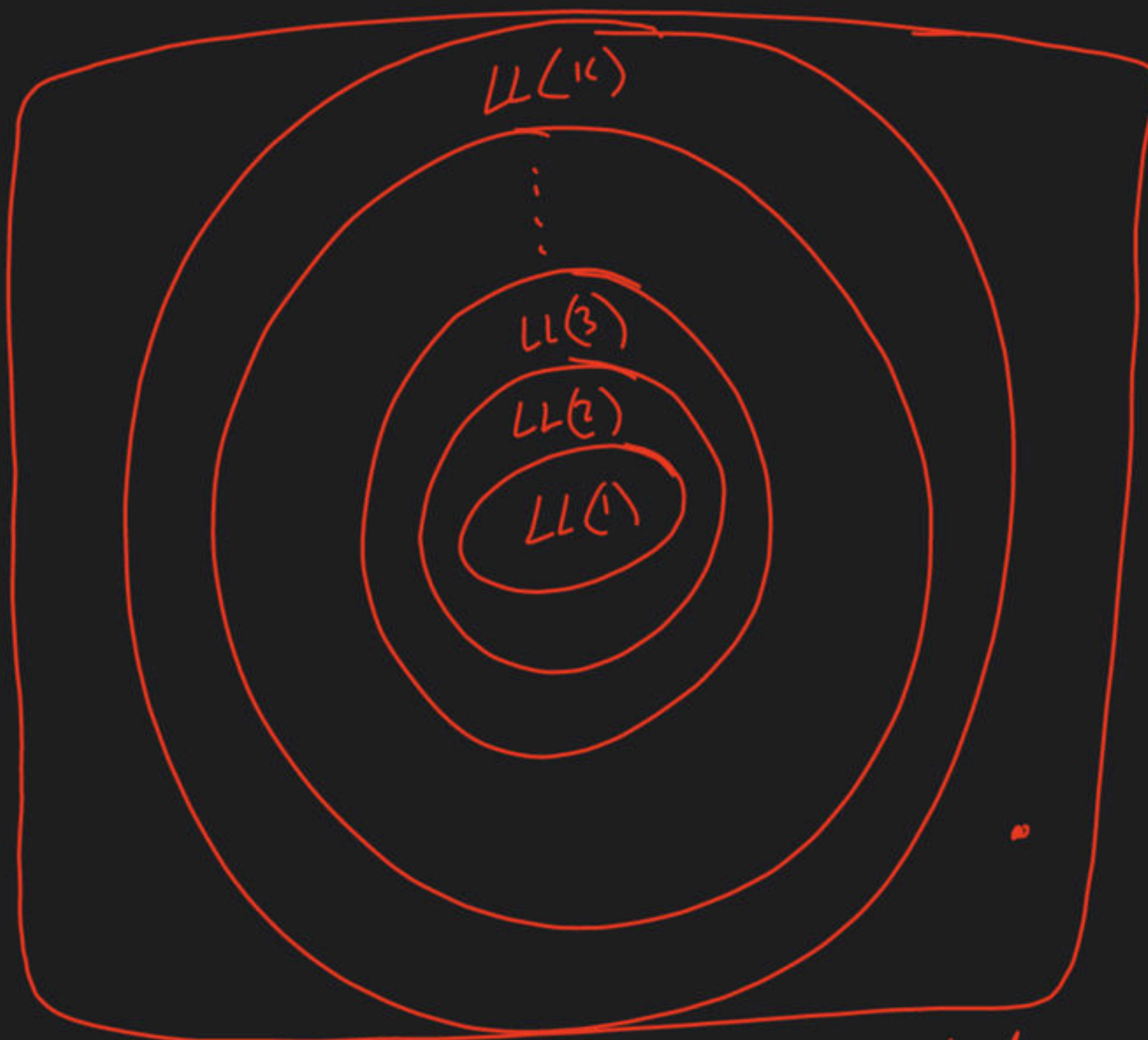
LL(2) ✗

LL(3) ✓

LL(1) < LL(2) < LL(3) .

... < LL(19)





no-LR, no-LF, no-Amb



no-ambiguous

$LR(1) \subset LR(2) \subset LR(3) \dots CLR(n)$



$LL(1) \subset LR(1)$   
 $LL(2) \subset LR(2)$

$LL(4) \subset LR(4)$



cr

$S \rightarrow \overset{LL}{Aca} / \overset{LL}{Bcb}$

$A \rightarrow c$

$B \rightarrow c$

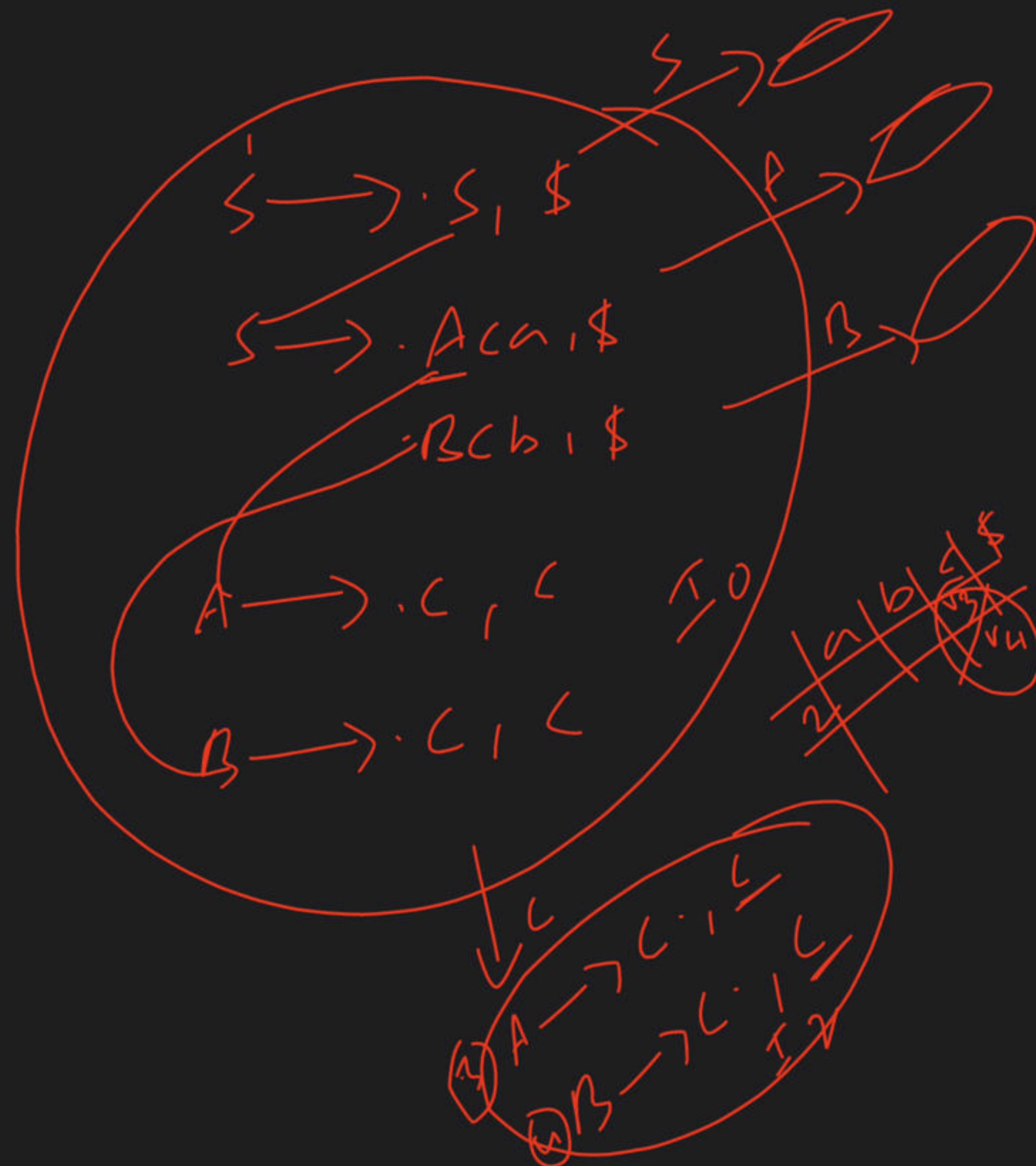
~~(a) LL(2)~~

(e) LR(0)

~~(b) LL(1)~~

(c) < LR(1) but not LL(1)

(d) not LL(2), not LR(1)



operator precedence Postfix



① operator grammar

② operator grammar : ① left hand side  
 ②  $\begin{matrix} 1' & 11' & 11' \end{matrix}$  2. adj-vec - on RHS



ex

$$E \rightarrow E + E \mid E * E \mid id$$

Am  
op ✓

$$E \rightarrow E + T \mid T$$

$$T \rightarrow T * F \mid F$$

$$F \rightarrow id$$

un  
op ✓

ex

$$E \rightarrow E + T \mid T \quad \text{un}$$

$$T \rightarrow T * F \mid F \quad \text{op}$$

$$F \rightarrow id \mid \epsilon$$

$$E \rightarrow E + E \mid E * E \mid id \mid \epsilon$$

Am  
op ✓

$$E \rightarrow EAE / id$$

$$A \rightarrow + / \epsilon$$

$$E \rightarrow E + E \mid E \epsilon E \mid id$$

$$S \rightarrow SAS / a$$

$$A \rightarrow \underline{bSb} / b$$

$$S \rightarrow SbSbS \mid SbS \mid a$$



$S \rightarrow a|b|c|d|e$

$P \rightarrow \cancel{S}|B$

$B \rightarrow b|c|d|e$

ex

$P \rightarrow SR | S$

$R \rightarrow bSR | bS$

$S \rightarrow wbs | w$

$w \rightarrow Lw | L$

$L \rightarrow id$

$\Rightarrow$



# Syntax Directed Translation (SDT)

