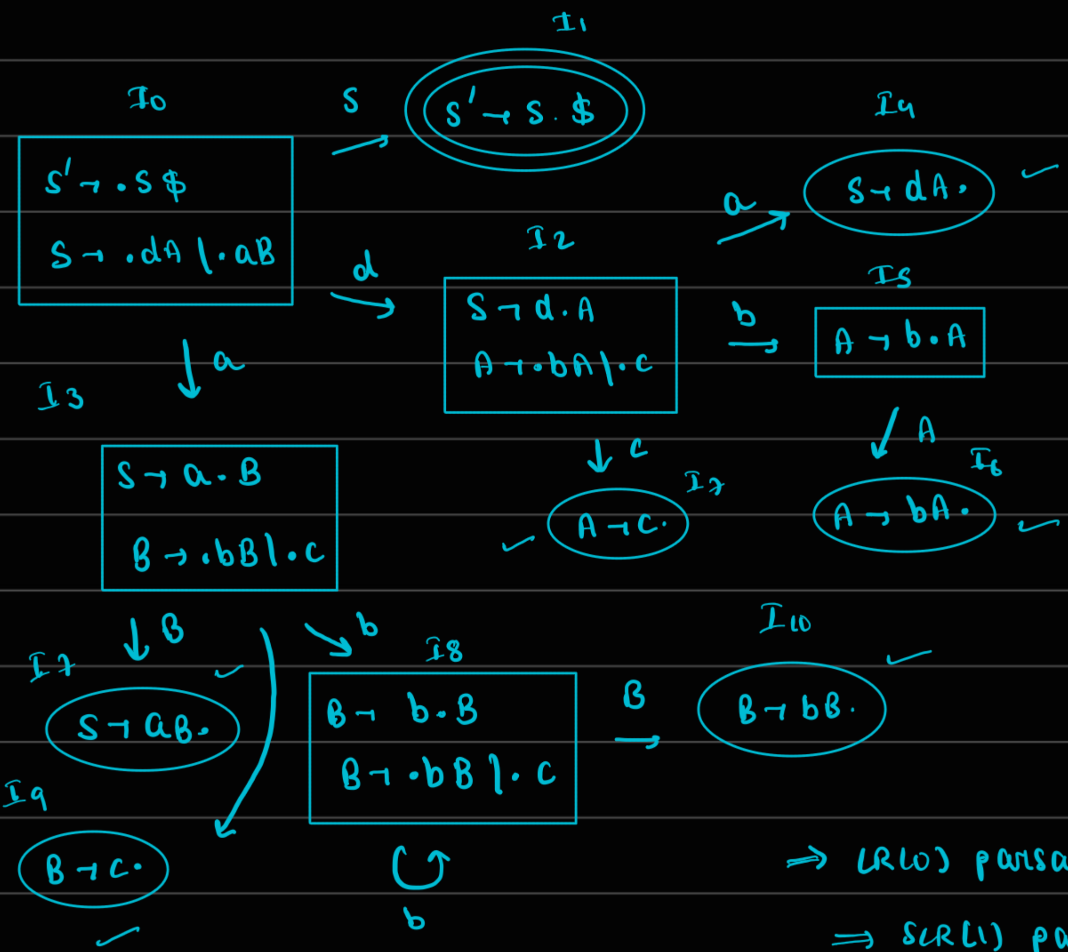
1 Check if grammar is LL(1), LR(0) or SLR(1) parseable:

① $S \to dA \mid aB$; $A \to bA \mid c$; $B \to bB \mid c$

LL(1) : $Fi(S) = \{d, a\}$; $Fi(A) = \{b, c\}$; $Fi(B) = \{b, c\}$

$\Rightarrow$ LL(1) parsable



$\Rightarrow$ LR(0) parsable

$\Rightarrow$ SLR(1) parsable

TRICK: To find SR/RR conflicts, just look at the final items.

If nothing goes out of it $\Rightarrow$ no shift conflict

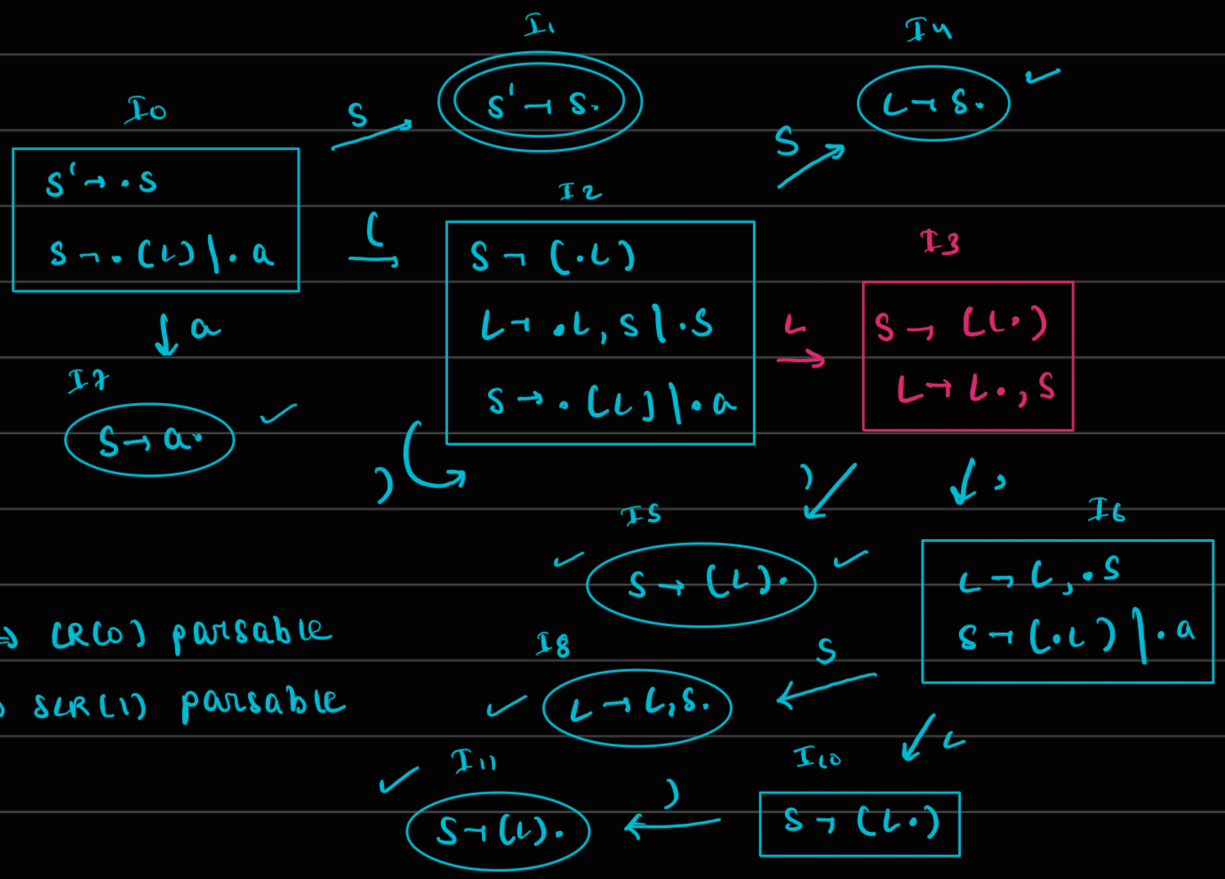
RR : figure it out by looking at the prod. rules

in it. If only one rule, no Reduce conflict, obviously

② $S \to (L) \mid a$; $L \to L , S \mid S$

LL(1) : $Fi(S) = \{ (, a \}$; $Fi(L) = \{ \ldots \}$ → To find this we would need to eliminate left recursion

⇒ Not LL(1) parsable



⇒ LR(0) parsable

⇒ SLR(1) parsable

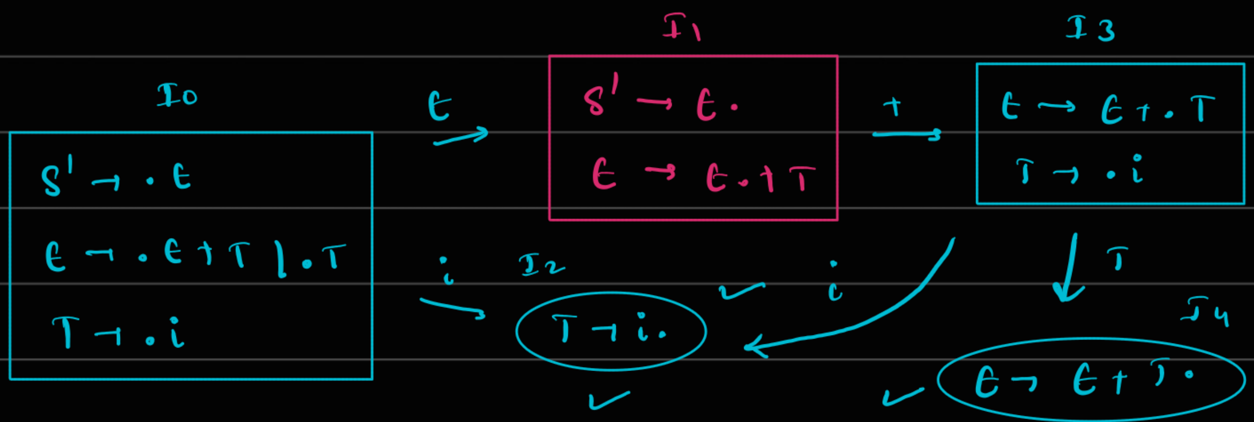
Very Imp →

There were 2 rules that were affected by input 'L' in I_2. Whenever multiple rules match, CLUB THEM INTO THE SAME ITEM IN THE NEXT STATE

③ $E \to E + T \mid T$; $T \to i$

LL(1) : $Fi(E) = \{ \ldots \}$ ⇒ needs left recursion to be eliminated

⇒ Not LL(1) parsable



⇒ LR(0) parsable

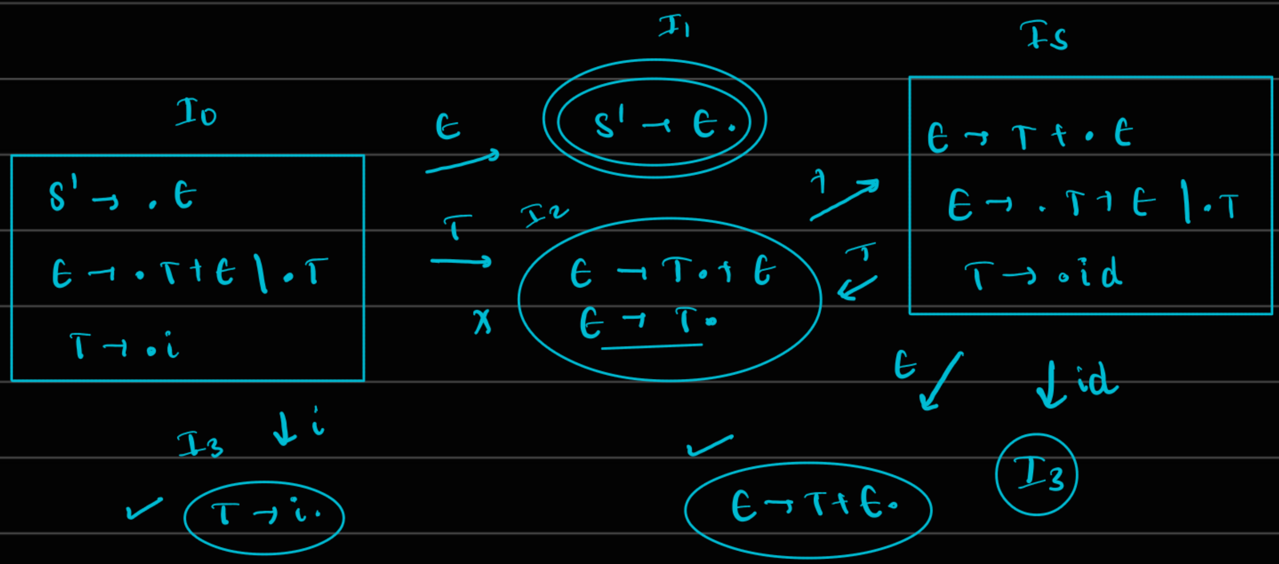
⇒ SLR(1) parsable

IMP → I2 is NOT AN SR CONFLICT since S' → E. is something we added (augmented grammar). Besides, S' → E. is ACCEPT not REDUCE

(4) $E \to \overset{p_1}{T+E} \mid \overset{p_2}{T}$; $\overset{p_3}{T \to i}$

LL(1) : FI(E) = {i, i} ✗

⇒ Not LL(1) parsable



⇒ Not LR(0) parsable

SLR(1) : Conflict occurred in I_2 (in rule $E \to T\cdot$) :

$Fo(LHS) = Fo(E) = \{\$\} \to$ does not have '+'

$\Rightarrow$ In SLR(1) parsing table, only S_4 will be present in cell (2, +) not rP_2 since rP_2 is only in (2, \$)

$\Rightarrow$ SLR(1) parsable

5) $S \to \overset{P_1}{AaAb} \mid \overset{P_2}{BbBa}$; $\overset{P_3}{A \to \varepsilon}$; $\overset{P_4}{B \to \varepsilon}$

Very Imp $\rightarrow$

$A \to \cdot\varepsilon$ & $A \to \varepsilon\cdot$ can be represented as $A \to \cdot$.

This is A FINAL STATE since there is nothing after it

LL(1) : $Fi(S) = \{a, b\}$; $Fi(A) = \{\varepsilon\}$; $Fi(B) = \{\varepsilon\}$

$\Rightarrow$ LL(1) parsable

I_0

$S' \to \cdot S$

$S \to \cdot AaAb \mid \cdot BbBa$

$A \to \cdot$

$B \to \cdot$

$\Rightarrow$ Not LR(0) parsable

SLR(1) : $Fo(A) = \{a, b\}$

$Fo(B) = \{a, b\}$

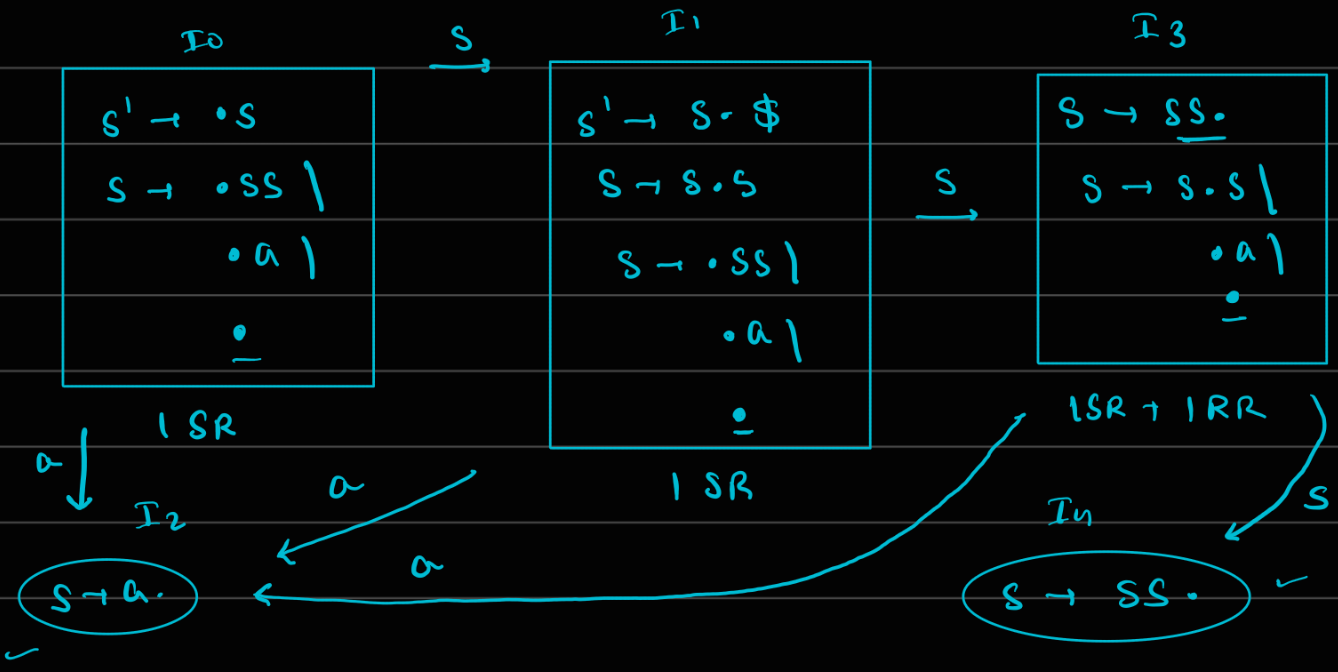
$\Rightarrow (0, a) = rP_3$ and rP_4

$(0, b) = rP_3$ and rP_4

$\Rightarrow$ Not SLR(1) parsable

2) Find the total no. of SR and RR conflicts :

1) $S \to SS \mid a \mid \varepsilon$ [LR(0) items]



$\Rightarrow$ 3 SR and 1 RR conflict