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# Assignment

## LR(0)

Let, $S' \to S$ ∴ Augment Grammar

$S' \to S$

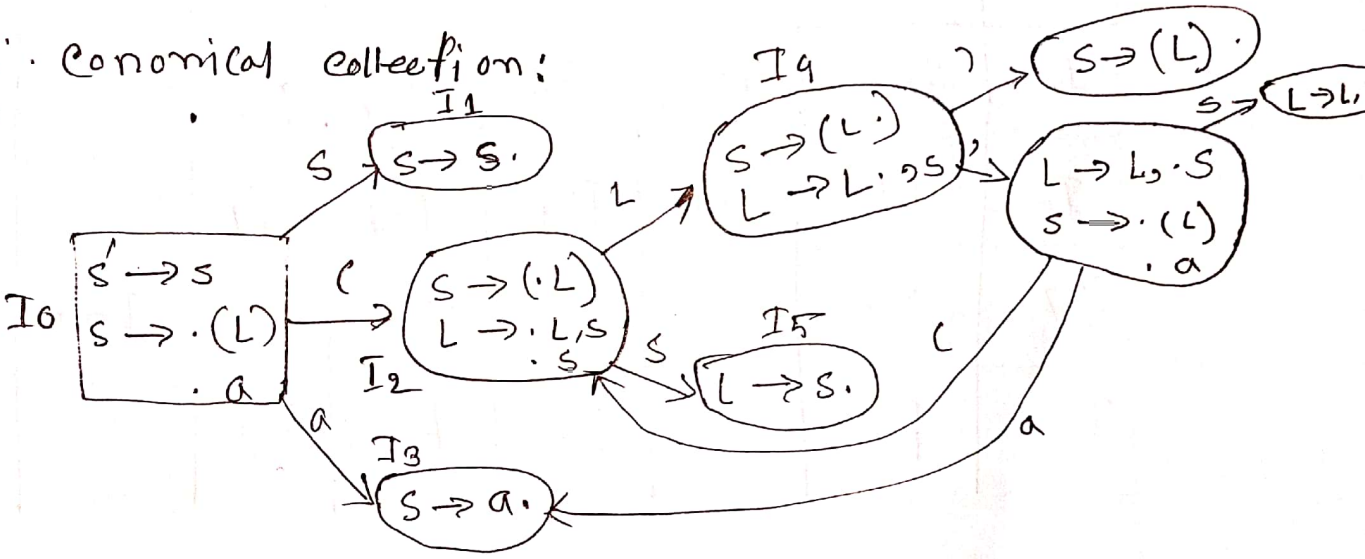
$S \to \cdot(L) \mid a$

### problem – 1

given $S \to (L) \mid a$

$L \to L, S \mid S$

∴ Canonical collection:




∴ LR(0) parsing table:

P. Puls:

$S \to (L)$ —— ①

$S \to a$ —— ②

$L \to L, S$ —— ③

$L \to S$ —— ④

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| | Action | | | | | Go to | |
|---|---|---|---|---|---|---|---|
| | ( | ) | a | , | $ | S | L |
| $I_0$ | $S_2$ | | $S_3$ | | | | |
| $I_1$ | | | | | Accept | | |
| $I_2$ | | | | | | $I_5$ | $I_4$ |
| $I_3$ | $R_2$ | $R_2$ | $R_2$ | $R_2$ | $R_2$ | | |
| $I_4$ | | $S_6$ | | $S_7$ | | | |
| $I_5$ | $R_4$ | $R_4$ | $R_4$ | $R_4$ | $R_4$ | | |
| $I_6$ | $R_1$ | $R_1$ | $R_1$ | $R_1$ | $R_1$ | | |
| $I_7$ | $S_2$ | | $S_3$ | | | $I_8$ | |
| $I_8$ | $R_3$ | $R_3$ | $R_3$ | $R_3$ | $R_3$ | | |

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# LR(0)

## problem – 02

given, $E \to E+T \mid T$

$T \to i$

Let, $E' \to E$

∴ Augmented Grammar :-

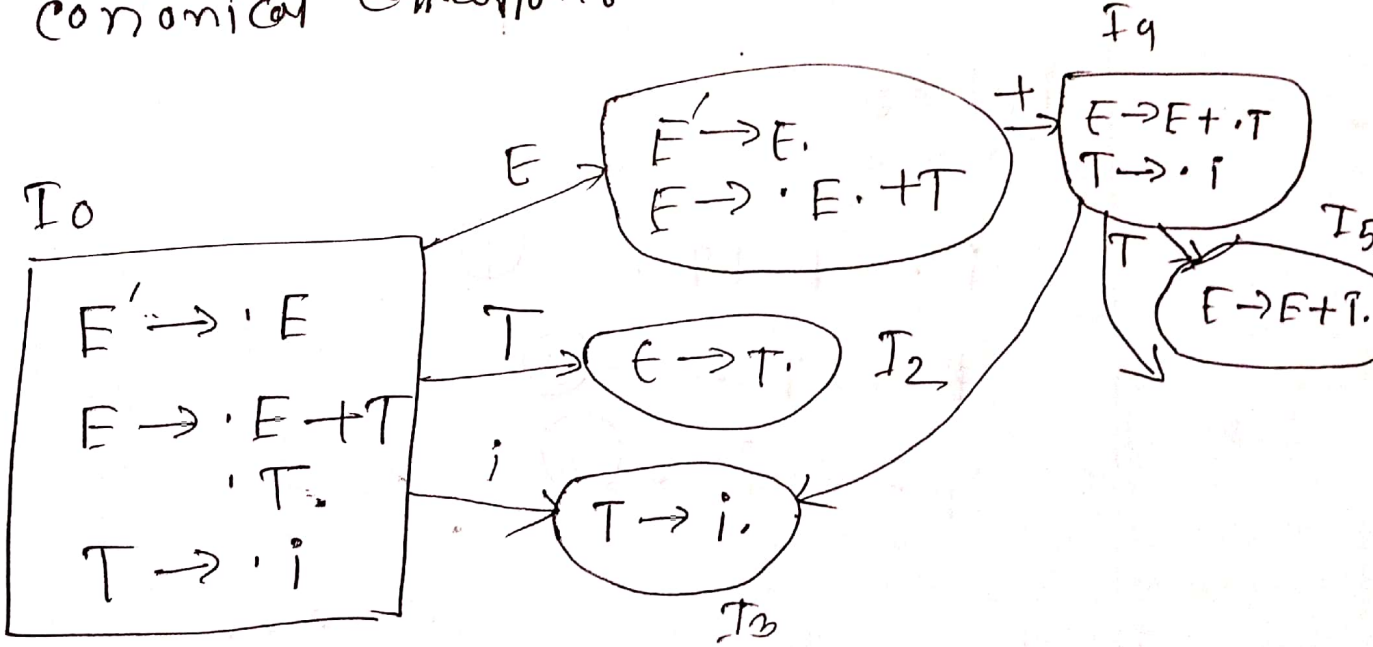
$E' \to \cdot E$

$E \to \cdot E+T$

$\cdot T$

$T \to \cdot i$

∴ canonical collection :-

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∴ LR(0) parsing table:

| | Action | | | Go to | |
|---|---|---|---|---|---|
| | + | i | $ | E | T |
| $I_0$ | | $S_3$ | Accept | $I_1$ | $I_2$ |
| $I_1$ | $S_4$ | | | | |
| $I_2$ | $R_2$ | $R_2$ | $R_2$ | | |
| $I_3$ | $R_3$ | $R_3$ | $R_3$ | | |
| $I_4$ | | | | | $I_5$ |
| $I_5$ | $R_1$ | $R_1$ | $R_1$ | | |

Rules:-

$E \rightarrow E+T$ —— (1)

$E \rightarrow T$ —— (2)

$T \rightarrow i$ —— (3)

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# LR (1)

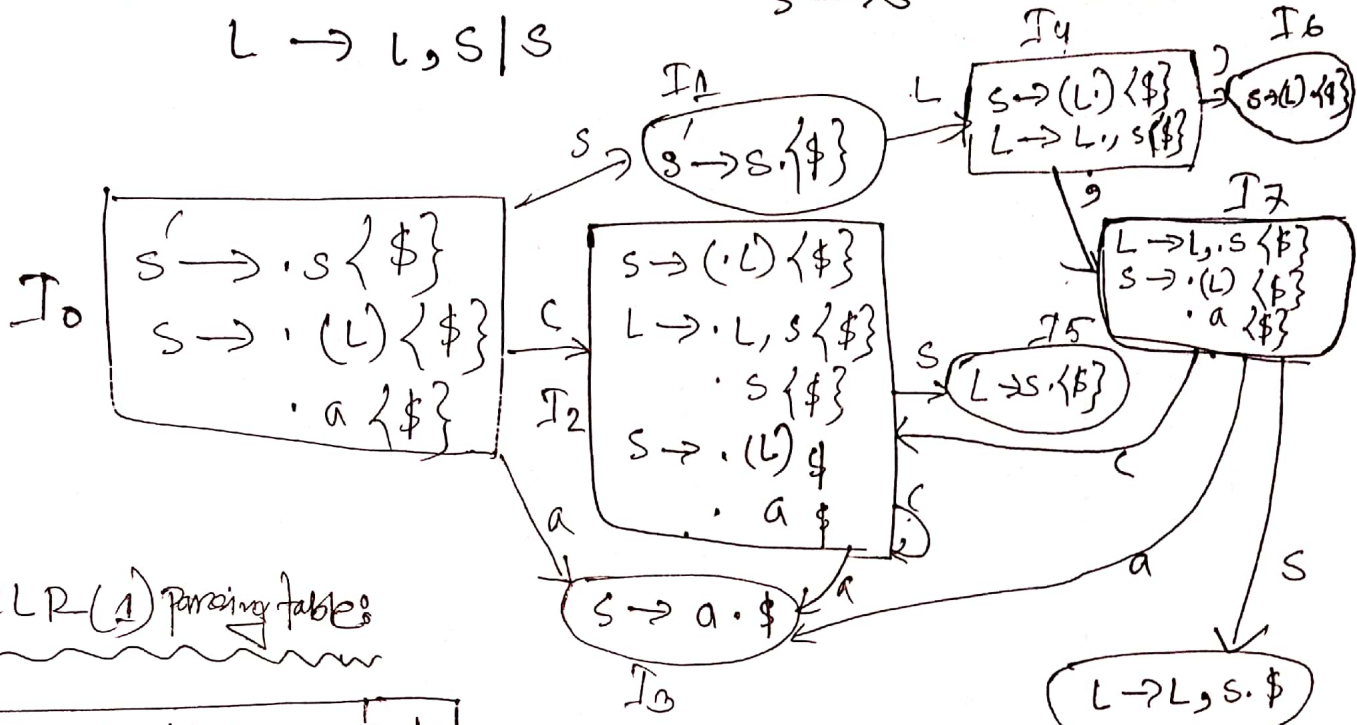
## Problem – 1:

Given, $S \to (L) \mid a$

$L \to L, S \mid S$

Let,

$S \to S$




## CLR (1) Parsing table:

| | Action | | | | | Goto | |
|---|---|---|---|---|---|---|---|
| | ( | ) | a | , | $ | S | L |
| I0 | S2 | | S3 | | | | |
| I1 | | | | | | | |
| I2 | S2 | | S3 | | | I5 | I4 |
| I3 | | | | | R2 | | |
| I4 | | S6 | | S7 | | | |
| I5 | | | | | R4 | | |
| I6 | | | | | R1 | | |
| I7 | | | S3 | | | I8 | |
| I8 | | | | | R3 | | |

**Rules:**

$S \to (L)$ — (1)

$S \to a$ — (2)

$L \to L, S$ — (3)

$L \to S$ — (4)

## LALR

| | Action | | | | | Goto | |
|---|---|---|---|---|---|---|---|
| | ( | ) | a | , | $ | S | L |
| I0 | S2 | | S3 | | | | |
| I1 | | | | | | | |
| I2 | S2 | | S3 | | | I5 | I4 |
| I3 | | | | | R2 | | |
| I4 | | S6 | | S7 | | | |
| I5 | | | | | R4 | | |
| I6 | | | | | R1 | | |
| I7 | | | S3 | | I8 | | |
| I8 | | | | | R3 | | |

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# LR(1)

## Problem: 02

Given, $E \to E+T/T$

$T \to i$

Let

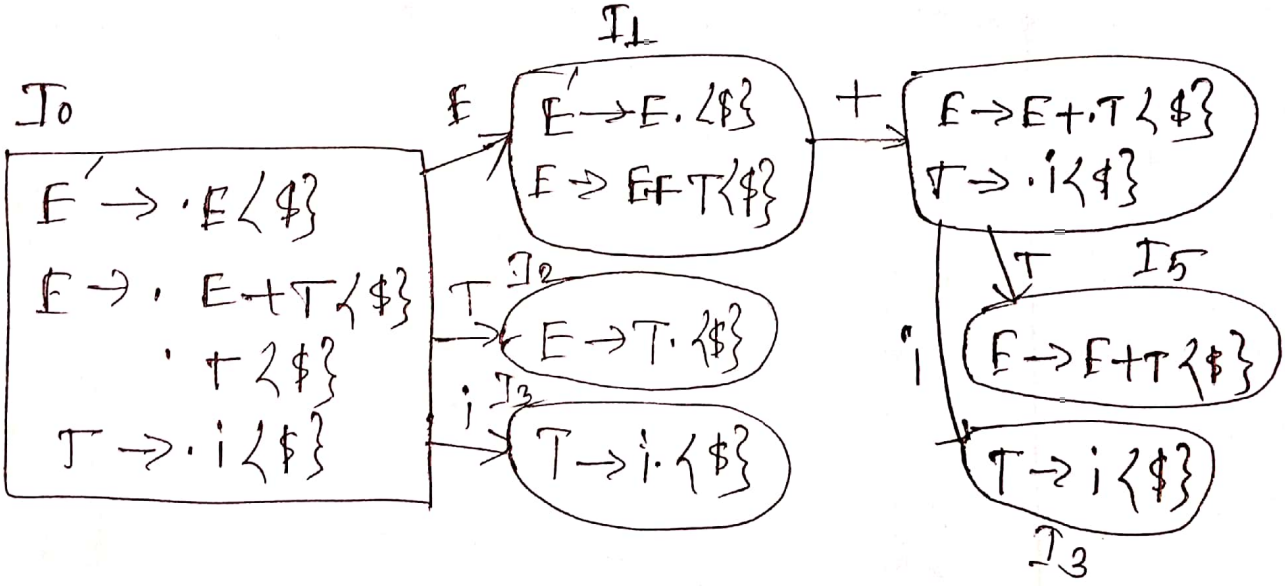
$E' \to E$

∴ Augmented Grammar

$E' \to \cdot E \{\$\}$

$E \to \cdot E+T \{\$\}$

$T \to \cdot i \{\$\}$

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CLR (1)

| | Action | | | Go to | |
|---|---|---|---|---|---|
| | + | i | $ | E | T |
| $I_0$ | | $S_3$ | | $I_1$ | $I_2$ |
| $I_1$ | $S_4$ | | | | |
| $I_2$ | | | $R_2$ | | |
| $I_3$ | | | $R_3$ | | |
| $I_4$ | | $S_3$ | | | $I_5$ |
| $I_5$ | | | $R_1$ | | |

Rules:

$E \rightarrow E+T$ — ①
$E \rightarrow T$ — ②
$T \rightarrow i$ — ③

LALR

| | Action | | | Go to | |
|---|---|---|---|---|---|
| | + | i | $ | E | T |
| $I_0$ | | $S_3$ | | $I_1$ | $I_2$ |
| $I_1$ | $S_4$ | | | | |
| $I_2$ | | $R_2$ | | | |
| $I_3$ | | $R_3$ | | | $I_5$ |
| $I_4$ | $S_3$ | | | | |
| $I_5$ | | $R_1$ | | | |

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