

Draw LR(1) Parsing table

Eg:- Construct LR(1) parsing table for augmented grammar,

$$0. S' \rightarrow S$$

$$1. S \rightarrow RL = R$$

$$2. S \rightarrow R$$

$$3. L \rightarrow *R$$

$$4. L \rightarrow id$$

$$5. R \rightarrow L$$

sol<sup>n</sup>

Canonical collection of LR(1) items of given augmented grammar. are

State  $I_0$ :

$$\text{closure}(S' \rightarrow \cdot S, \$)$$

$$\{ S' \rightarrow \cdot S, \$ \}$$

$$S \rightarrow \cdot L = R, \$$$

$$S \rightarrow \cdot R, \$$$

$$L \rightarrow \cdot *R, \$$$

$$L \rightarrow \cdot id, \$$$

$$R \rightarrow \cdot L, \$$$

State  $I_1$ :

$$\text{goto}(I_0, S)$$

$$= \text{closure}(S' \rightarrow S \cdot, \$)$$

$$= \{ S' \rightarrow S \cdot, \$ \}$$

State  $I_2$ :

$$\text{closure}(\text{goto}(I_0, L))$$

$$= \text{closure}(S \rightarrow R \cdot, \$)$$

$$= \{ S \rightarrow R \cdot, \$ \}$$

State  $I_3$ :

$$\text{goto}(I_0, L)$$

$$= \text{closure}(S \rightarrow L \cdot = R, \$), (L \rightarrow L \cdot, \$)$$

$$= \{ S \rightarrow L \cdot = R, \$ \}, (L \rightarrow L \cdot, \$)$$



State  $I_4$

$$\begin{aligned}
 &= \text{closure}(\text{goto}(I_0, \text{id})) \\
 &= \text{closure}(L \rightarrow *R, =) \\
 &= \{ L \rightarrow *R, = \\
 &\quad R \rightarrow \cdot L, = \\
 &\quad L \rightarrow \cdot *R, = \\
 &\quad L \rightarrow \cdot \text{id}, = \}
 \end{aligned}$$

State  $I_5$ :

$$\begin{aligned}
 &\text{closure}(\text{goto}(I_0, \text{id})) \\
 &= \text{closure}(L \rightarrow \text{id}, =) \\
 &= \{ L \rightarrow \text{id}, = \}
 \end{aligned}$$

State  $I_6$ :

$$\begin{aligned}
 &\text{closure}(\text{goto}(I_2, =)) \\
 &= \text{closure}(S \rightarrow R = \cdot R, \$) \\
 &= \{ S \rightarrow L = \cdot R, \$), (R \rightarrow \cdot L, \$), (L \rightarrow \cdot *R, \$), (L \rightarrow \cdot \text{id}, \$) \}
 \end{aligned}$$

State  $I_7$ :

$$\begin{aligned}
 &\text{closure}(\text{goto}(I_4, R)) \\
 &= \text{closure}(L \rightarrow *R, =) \\
 &= \{ L \rightarrow *R, = \}
 \end{aligned}$$

State  $I_8$ :

$$\begin{aligned}
 &\text{closure}(\text{goto}(I_4, L)) \\
 &= \text{closure}(R \rightarrow L, =) \\
 &= \{ R \rightarrow L, = \}
 \end{aligned}$$

State  $I_9$ :

$$\begin{aligned}
 &\text{closure}(\text{goto}(I_6, R)) \\
 &= \text{closure}(S \rightarrow L = R \cdot, \$) \\
 &= \{ S \rightarrow L = R \cdot, \$ \}
 \end{aligned}$$

State  $I_{10}$ :

$$\begin{aligned}
 &\text{closure}(\text{goto}(I_6, L)) \\
 &= \text{closure}(L \rightarrow *R, \$) \\
 &= \text{closure}(R \rightarrow \cdot L, \$) \\
 &= \{ R \rightarrow \cdot L, \$ \}
 \end{aligned}$$

State  $I_{11}$ :

$$\begin{aligned}
 &\text{closure}(\text{goto}(I_6, *)) \\
 &= \text{closure}(L \rightarrow * \cdot R, \$) \\
 &= \{ L \rightarrow * \cdot R, \$), (R \rightarrow \cdot L, \$), (L \rightarrow \cdot *R, \$), (L \rightarrow \cdot \text{id}, \$) \}
 \end{aligned}$$



State  $I_{12}$  :-

$$\begin{aligned} & \text{closure}(\text{goto}(I_6, id)) \\ &= \text{closure}(L \rightarrow id \cdot, \$) \\ &= \{ L \rightarrow id \cdot, \$ \$ \} \end{aligned}$$

State  $I_{13}$  :

$$\begin{aligned} & \text{closure}(\text{goto}(I_{11}, R)) \\ &= \text{closure}(L \rightarrow *R \cdot, \$) \\ &= \{ L \rightarrow *R \cdot, \$ \$ \} \end{aligned}$$

Now, construct LR(0) parsing table

States	Action table				Goto table		
	$id$	$*$	$=$	$\$$	$S$	$L$	$R$
0	$S_5$	$S_4$			$I_1$	$I_2$	$I_3$
1				Accept			
2			$S_6$	$R_5$			
3				$R_2$			
4	$S_5$	$S_4$				$I_8$	$I_7$
5			$R_4$	$R_4$			
6	$S_{12}$	$S_{11}$				$I_{10}$	$I_9$
7			$R_3$	$R_3$			
8			$R_5$	$R_5$			
9				$R_1$			
10				$R_5$			
11	$S_{12}$	$S_{11}$				$I_{10}$	$I_{13}$
12				$R_4$			
13				$R_3$			