

LALR - Example

Grammar

$S \rightarrow L = R$
 $S \rightarrow R$
 $L \rightarrow * R$
 $L \rightarrow id$
 $R \rightarrow L$

Augmented Grammar

$S' \rightarrow S \$$
 $S \rightarrow L = R$
 $S \rightarrow R$
 $L \rightarrow * R$
 $L \rightarrow id$
 $R \rightarrow L$

Canonical collection of LR(1) items

I_0 : closure of $S' \rightarrow \cdot S, \$$

$S' \rightarrow \cdot S, \$$
 $S \rightarrow \cdot L = R, \$$
 $S \rightarrow \cdot R, \$$
 $L \rightarrow \cdot * R, =/\$$
 $L \rightarrow \cdot id, =/\$$
 $R \rightarrow \cdot L, \$$

I_1 : Goto(I_0, S)

$S' \rightarrow S \cdot, \$ \checkmark$

I_2 : Goto(I_0, L)

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

I_3 : Goto(I_0, R)

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

~~I_4 : Goto($I_0, *$)~~

~~$L \rightarrow * \cdot R, =/\$$~~

~~I_4 : Goto($I_0, *$)~~

~~$L \rightarrow * \cdot R, =/\$$~~

I_4 : Goto($I_0, *$)

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

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

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

$L \rightarrow \cdot id, =/\$$

I_5 : Goto(I_0, id)

$L \rightarrow id \cdot, =/\$ \checkmark$

I_6 : Goto($I_2, =$)

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

$R \rightarrow \cdot L, \$$

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

~~I_7 : Goto($I_4, *$)~~

$L \rightarrow \cdot id, \$$

I_7 : Goto(I_4, R)

$L \rightarrow * R \cdot, =/\$ \checkmark$

I_8 : Goto(I_4, L)

$R \rightarrow L \cdot, =/\$ \checkmark$

I_9 : Goto(I_6, R)

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

I_{10} : Goto(I_6, L)

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

I_{11} : Goto($I_6, *$)

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

$R \rightarrow \cdot L, \$$

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

$L \rightarrow \cdot id, \$$

$Goto(I_4, *) = I_4$
 $Goto(I_4, id) = I_5$

$Goto(I_{11}, L) = I_{10}$
 $Goto(I_{11}, *) = I_{11}$
 $Goto(I_{11}, id) = I_{12}$

$I_{12} : \text{Goto}(I_6, id)$

$L \rightarrow id \cdot, \$$

$I_{13} : \text{Goto}(I_{11}, R)$

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

~~$I_{14} : \text{Goto}(I_{11}, R)$~~

~~$R \rightarrow R \cdot, \$$~~

4 and 11 \Rightarrow same productions
different LA

Combine them to form I_{411}

Similarly,

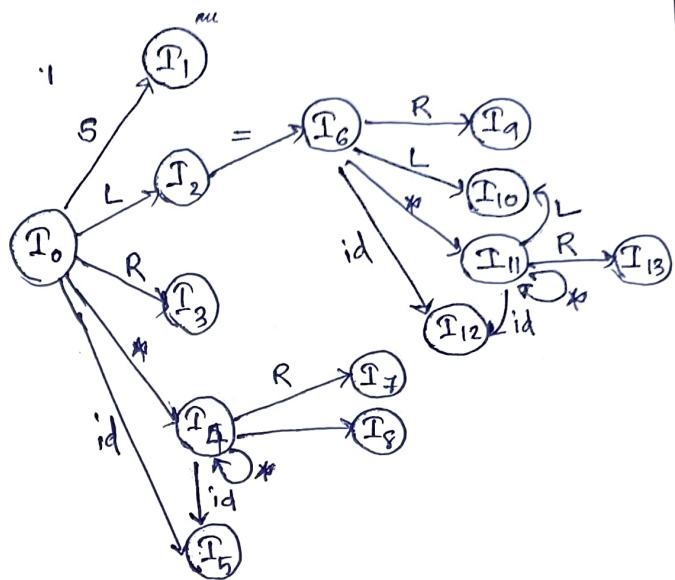
5 and 12 $\Rightarrow I_{512}$

7 and 13 $\Rightarrow I_{713}$

8 and 10 $\Rightarrow I_{810}$

Parsing table construction.

States	Action				Goto		
	id	=	*	\$	S	L	R
0	S_{512}		S_{411}		1	2	3
1				acc			
2		S_6		r_5			
3				r_2			
411	S_{512}		S_{411}			810	713
512		r_4		r_4			
6	S_{512}		S_{411}			810	9
713		r_3		r_3			
810		r_5		r_5			
9				r_1			



$S \rightarrow L = R$ — r_1
 $S \rightarrow R$ — r_2
 $L \rightarrow *R$ — r_3
 $L \rightarrow id$ — r_4
 $R \rightarrow L$ — r_5