ATCD - NOTES

LR (0)
↓
LALR
CLR
SLR.

The SLR Parser, CLR parser, LALR parser are the parts of the Bottom up Parser.

The **SLR parser** is similar to LR(0) parser except that the reduced entry. The reduced productions are written only in the follows of the variable whose production is reduced...

CLR Parser In the SLR method we were working with LR(0) items. In CLR parsing we will be using LR (1) items. LR(K) item is defined to be an item using lookaheeds of length K.

P.T.O →

(1) LALR Look ahead LR

	a	b	$	S	C
0	S_{36}	S_{47}		1	2
1			Accept		
2	S_{89}	S_{47}			5
3	S_{36}	S_{47}			89
4	r_3	r_3	r_3		
5			r_1		
6	S_6	S_{47}			89
7			r_3		
8	r_2	r_2	r_2		
9			r_2		

I_4 : $C \to b$; a/b
I_7 : $C \to b$; $

} I_{47}

I_8 : $C \to aC$, a/b

I_9 : $C \to aC$, $

I_3 : $C \to a \cdot C$, a|b
$C \to a \cdot C$, a|b
$C \to a \cdot b$, a|b

I_6 : $C \to a \cdot C$, $
$C \to a \cdot C$, $
$\to \cdot b \ldots$, $

	a	b	$	S	C
0	S_{36}	S_{47}		1	2
1			Accept		
2	S_{85}	S_{47}			5
36	S_{36}	S_{47}			89
47	r_3	r_3	r_3		
5			r_1		
89	r_2	r_2	r_2		

→ Most Powerful LR Parser is the CALR Parser.

(3) CLR Parser

Item	Set of items	Goto(I, X)
I_0	$S' \to .S, \$$ $S \to .L=R, \$$ $S \to .R, \$$ $L \to .*R, =/\$$ $L \to .id, =/\$$ $R \to .L, \$$	
I_1	$S' \to S., \$$	(I_0, S)
I_2	$S \to L.=R, \$$ $R \to L., \$$	(I_0, L)
I_3	$S \to R., \$$	(I_0, R)
I_4	$L \to *.R, =/\$$ $R \to .L, =/\$$ $L \to .*R, =/\$$ $L \to .id, =/\$$	$(I_0, *)$ $(I_4, *)$
I_5	$L \to id., =/\$$	(I_0, id) (I_4, id)
I_6	$S \to L=.R, \$$ $R \to .L, \$$ $L \to .*R, \$$ $L \to .id, \$$	$(I_2, =)$

I_7	$L \to *R \cdot , = / \$$	(I_4, R_4)
I_8	$R \to L \cdot = / \$$	(I_4, L)
I_9	$S \to L = R \cdot , \$$	(I_6, R)
I_{10}	$R \to L \cdot , \$$	(I_6, L) (I_{11}, L)
I_{11}	$L \to * \cdot R , \$$ $R \to \cdot L , \$$ $L \to \cdot * R , \$$ $L \to \cdot id , \$$	$(I_6, *)$ $(I_{11}, *)$
I_{12}	$L \to id \cdot , \$$	(I_6, id) (I_{11}, id)
I_{13}	$L \to * R \cdot , \$$	(I_{11}, id)

State	Action				Goto		
	id	*	=	$	S	L	R
0	s5	s4			1	2	3
1				acc			
2			s6	r5			
3				r2			
4	s5	s4				8	7
5			r4	r4			
6	s12	s11				10	9
7			r3	r3			
8			r5	r5			
9				r1			
10				r5			
11	s12	s11			10		13
12				r4			
13				r3			

(2)

LR(0) items in SLR Parsing.

Bottom-up Parsing Technique

Given Grammar:

$E \to E+T$
$E \to T$
$T \to T*F$
$T \to F$
$F \to (E)$
$F \to id$

Augmented grammar

$E' \to E$

↓ new non-terminal symbol

$E \to E+T$
$E \to T$
$T \to T*F$
$T \to F$
$F \to (E)$
$F \to id$

Same

Canonical LR(0) collection — closure & goto

I_0 : $E' \to .E$
$E \to .E+T$
$E \to .T$
$T \to .T*F$
$T \to .F$
$F \to .(E)$ → terminal symbol (open parenthesis)
$F \to .id \to (id)$

goto (bring dot at end)

goto (I_0, E)

I_1 : $E' \to E.$
$E \to E.+T$

closure: dot followed by a non-terminal

goto (I_0, T)

I_2 : $E \to T.$

$T \to T. * F$

goto (I_0, F) (dot followed by F)

I_3 : $T \to F.$

goto $(I_0, ( )$

I_4 : $F \to (.E)$

dot followed by non-terminal (so closure is possible)

. followed by E

$E \to .E + T$

$E \to .T$

$T \to .T * F$

$T \to .F$

$F \to .(E)$

$F \to .id.$

goto (I_0, id)

I_5 : $F \to id.$

goto (I_1 , +)

I_6 : $E \to E + \cdot T$

$T \to \cdot T * F$

$T \to \cdot F$

$F \to \cdot (E)$

$F \to \cdot id$

goto (I_2 , *)

I_7 : $T \to T * \cdot F$

$F \to \cdot (E)$

$F \to \cdot id$

$I_3 \longrightarrow$ dot already at the end.

I_4

goto (I_4 , E) . dot followed by E check for

I_8 : $F \to (E \cdot)$

$E \to E \cdot + T$

(I_4 & T) consider next check for dot followed by T . But same as we got in goto (I_0 , T) so next

check for
$(I_0, F) \rightarrow$ dot followed by F

already got in goto (I_0, F).

goto (I_6, T) check for dot followed by T and check the dot & symbol.

I_9 : $E \rightarrow E + T \cdot$

$T \rightarrow T \cdot * F$

↓

terminal symbol

If we check for (I_6, F), (I_6, T), (I_6, id) already got ans so leave

Now goto I_7.

goto (I_7, F)

I_{10} : $T \rightarrow T * F \cdot$

$F \rightarrow \cdot(E)$ $F \rightarrow \cdot id$

already got ans so leave.

goto $(I_8,)$)

I_{11} : $F \rightarrow (E) \cdot$

For next one

$E \rightarrow E \cdot + T$

ie

$E \rightarrow E + \cdot T$ (already got in I_6.) so leave