

LR(1) parsing table

Step-1

In LR(1) parsing like previous parsing table in Action we place all terminals symbols including \$ & GOTO we place all non-terminals.

Step-2

Along vertical axis we place number of states as (I_0, I_1, \dots, I_g) numbered from 0 to g .

Step-3

In table $GOTO(I_i, A) = I_j$ place j entry in table corresponding to non-terminal A .

Step-4

In table $GOTO(I_i, a) = I_j$ then set $ACTION(i, a) = \text{shift}$
Here a is a terminal.

Step-5

If $[A \rightarrow \alpha \cdot, a]$ is in $I_i, A \neq S'$ then set $ACTION[i, a]$ to reduce $A \rightarrow \alpha$

Step-6

If $[S' \rightarrow S \cdot, \$]$ is in I_i then set $ACTION[i, \$]$ to 'Accept'.

		terminals			non-terminals	
		ACTION			GOTO	
	shift	a	d	\$	S	C
No. of state	0	S3	S4		1	2
	1			Accept		
	2	S6	S7			5
	3	S3	S4			8
	4	r3	r3			
	5			r1		
	6	S6	S7			9
	7			r3		
	8	r2	r2			
	9			r2		

No. of states (I₀ - I₉)

(A-reduce entry)

→ For number in GOTO follow goto we calculated i.e. for first row corresponding to state 0
 $\text{goto}(I_0, S) \rightarrow I_1$ so number 1 is placed in GOTO section of table under non-terminal 'S'.

$\text{goto}(I_0, C) \rightarrow I_2$

→ For shift entry in table again follow goto calculated on terminals
 i.e. $\text{goto}(I_0, a) \rightarrow I_3$ so number 3 with shift(s) is placed in ACTION section of table under terminal symbols.

→ For reduce entry in table search the state in which
(.) is at last position of R.H.S. eg.

$\text{goto}(I_0, d) \rightarrow I_4$

$C \rightarrow d \cdot, a \mid d$

So make entry reduce against state 4 for terminals
a & d and $C \rightarrow d$ is (3) production in
given grammar so reduce it by r_3 .

(1) $S \rightarrow CC$

(2) $C \rightarrow \cdot aC$

(3) $C \rightarrow d \cdot$

For practice

Ques

Consider the grammar

$S \rightarrow L \mid R \mid R$

$L \rightarrow * R \mid id$

$R \rightarrow L$

Construct LR(1) set of items & also construct LR(1)
parsing table.