7.12.2021

Seminar 10 – LR(0) parsing

Ex.: Given the grammar G=({S,A}, {a,b,c}, {S->aA, A->bA | c}, S), parse the sequence w = abbc using an LR(0) parser.

S' -> S

(1) S->aA
(2) A->bA
(3) A->c

LR(0) item $[A \to \alpha.\beta]$

$[A \to \alpha.B\beta], [B \to .\gamma]$

I. Compute canonical collection of states #VA: David T.

s_0 = closure({[S'->.S]}) = {[S'->.S], [S->.aA]}
s_1 = goto(s_0, S) = closure({[S'->S.]}) = {[S'->S.]}
goto(s_0, A) = ∅ = goto(s_0, b) = goto(s_0, c)
s_2 = goto(s_0, a) = closure({[S->a.A]}) = {[S->a.A], [A->.bA], [A->.c]}
s_3 = goto(s_2, A) = closure({[S->aA.]}) = {[S->aA.]}
s_4 = goto(s_2, b) = closure({[A->b.A]}) = {[A->b.A], [A->.bA], [A->.c]}
s_5 = goto(s_2, c) = closure({[A->c.]}) = {[A->c.]}
s_6 = goto(s_4, A) = closure({[A->bA.]}) = {[A->bA.]}
goto(s_4, b) = closure({[A->b.A]}) = s_4
goto(s_4, c) = closure({[A->c.]}) = s_5

C = $\{s_0, s_1, s_2, s_3, s_4, s_5, s_6\}$

II. Build LR(0) parsing table #VA: Andrada T.

			GOTO			
	ACTION	S	A	a	b	c
0	shift	1		2		
1	accept					
2	shift		3		4	5
3	reduce1					
4	shift		6		4	5
5	reduce3					
6	reduce2					

III. Parse the sequence #VA: Andrada T.

Work stack	Input stack	Output band
$0	abbc$	ϵ
$0a2	bbc$	ϵ
$0a2b4	bc$	ϵ
$0a2b4b4	c$	ϵ
$0a2b4b4c5	$	ϵ
$0a2b4b4A6	$	3
$0a2b4A6	$	23
$0a2A3	$	223
$0S1	$	1223
acc	$	1223

S => aA => abA => abbA => abbc (! Rightmost derivation)