Tutorial-4

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BANSI MARAKANA
U20CS005

1. Consider the following grammar:

S → AS | b

A → SA | a

Construct the SLR parse table for the grammar. Show the actions of the parser, for input string "abab".

→ Indirect left recursion is present in the grammar.

S → AS | b

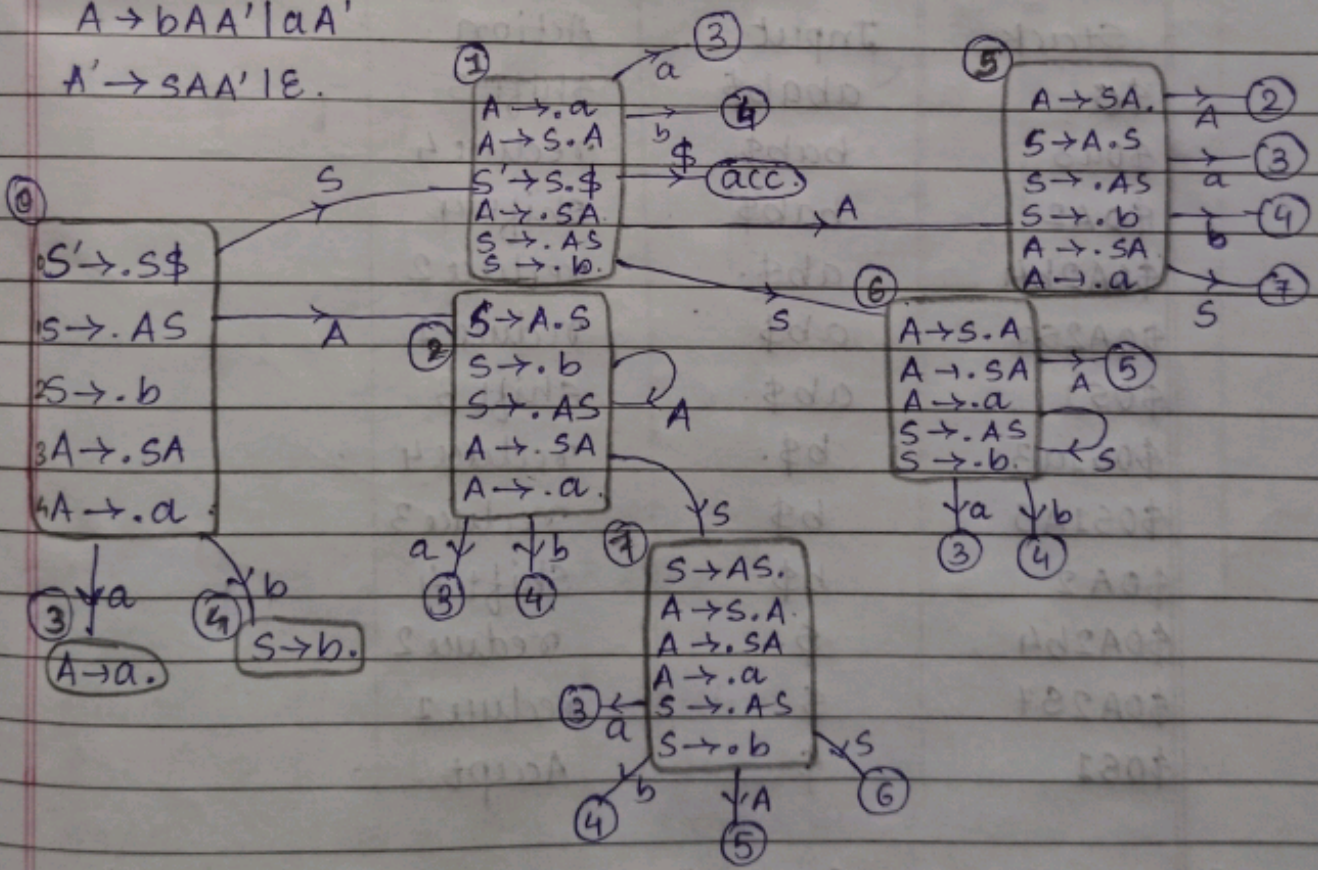
A → ASA | bA | a.

After removing left recursion we get,

S → AS | b.

A → bAA' | aA'

A' → SAA' | ε.



	First	Follow
S	a, b	$, a, b
A	a, b	$, a, b

SLR Parsing table

State	a	b	$	S	A
0	s3	s4		1	2
1	s3	s4	Acc.	6	5
2	s3	s4		7	2
3	r4	r4	r4		
4	r2	r2	r2		
5	s3/r3	s4/r3	r3	7	2
6	s3	s4		6	5
7.	s3/r1	s4/r1	r1	6	5

Stack	Input	Action
$0	abab$	shift 3
$0a3	bab$	reduce 4
$0A2	bab$	shift 4
$0A2b4	ab$.	reduce 2
$0A2S7	ab$	reduce 1
$0S1	ab$.	shift 3
$0S1a3	b$.	reduce 4
$0S1A5	b$	reduce 3
$0A2	b$	shift 4
$0A2b4	$.	reduce 2
$0A2S7	$	reduce 1
$0S1	$	Accept.

2. Consider the following grammar

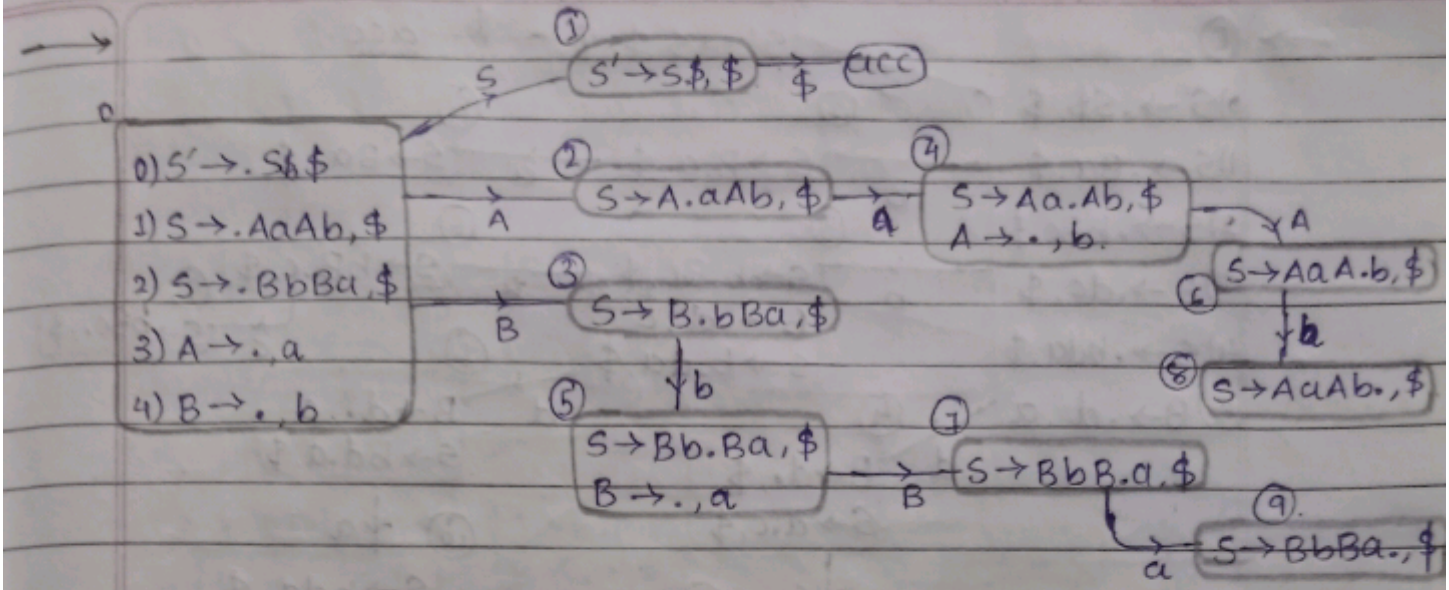
S → A aAb | BbBa

A → ε B → ε

A) Obtain the canonical collection of set of LR(1) item.

B) Construct the CLR parsing table for this grammar

C) Show the moves of CLR parser for input "aabb".

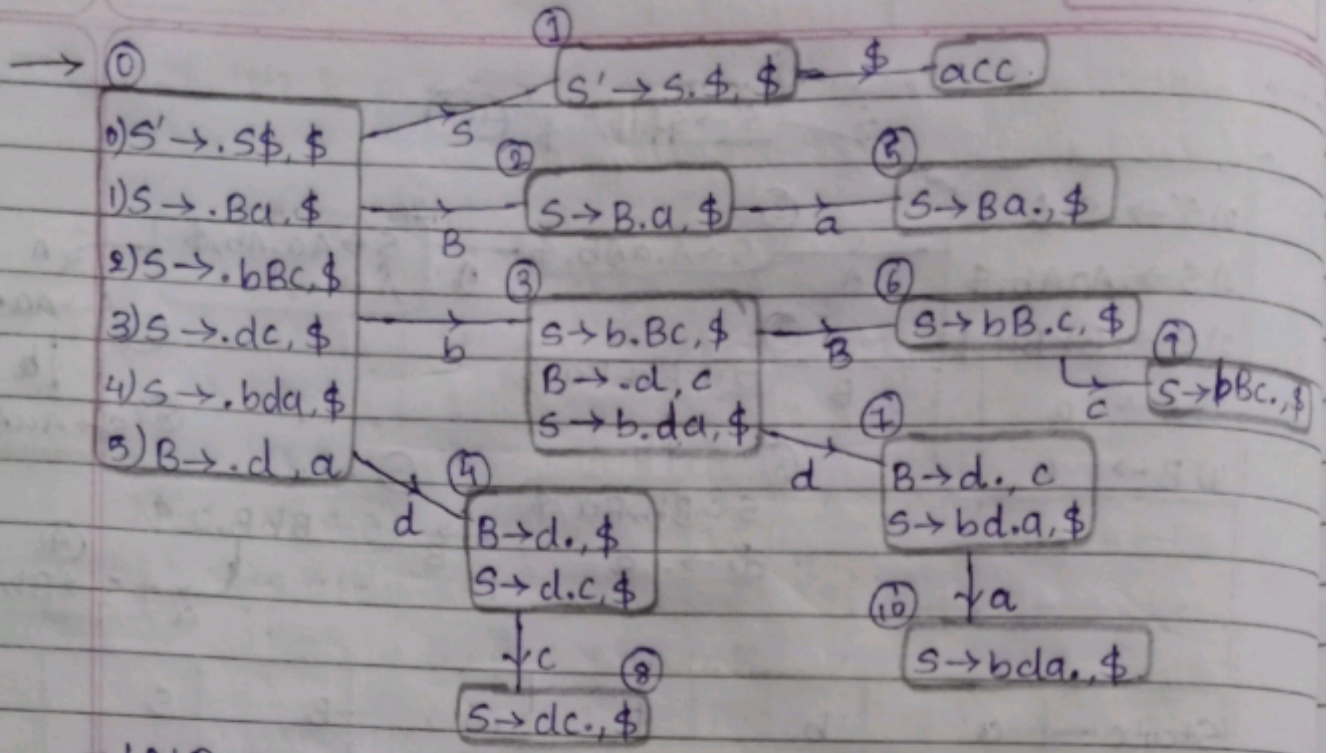


State	a	b	$	A	B	S
0	r3	r4		2	3	1
1			acc.			
2	S4					
3		S5				
4		r3		6		
5	r4				7	
6		S8				
7	S9					
8			r1			
9			r2			

Stack	Input	Action
$0	aabb$	reduce3
$0A2	aabb$	Shift 4
$0A2a4	abb$	No action

String is not accepted.

3 Construct LALR parsing table for the grammar
S→BalbBc|dc|bda
B→d



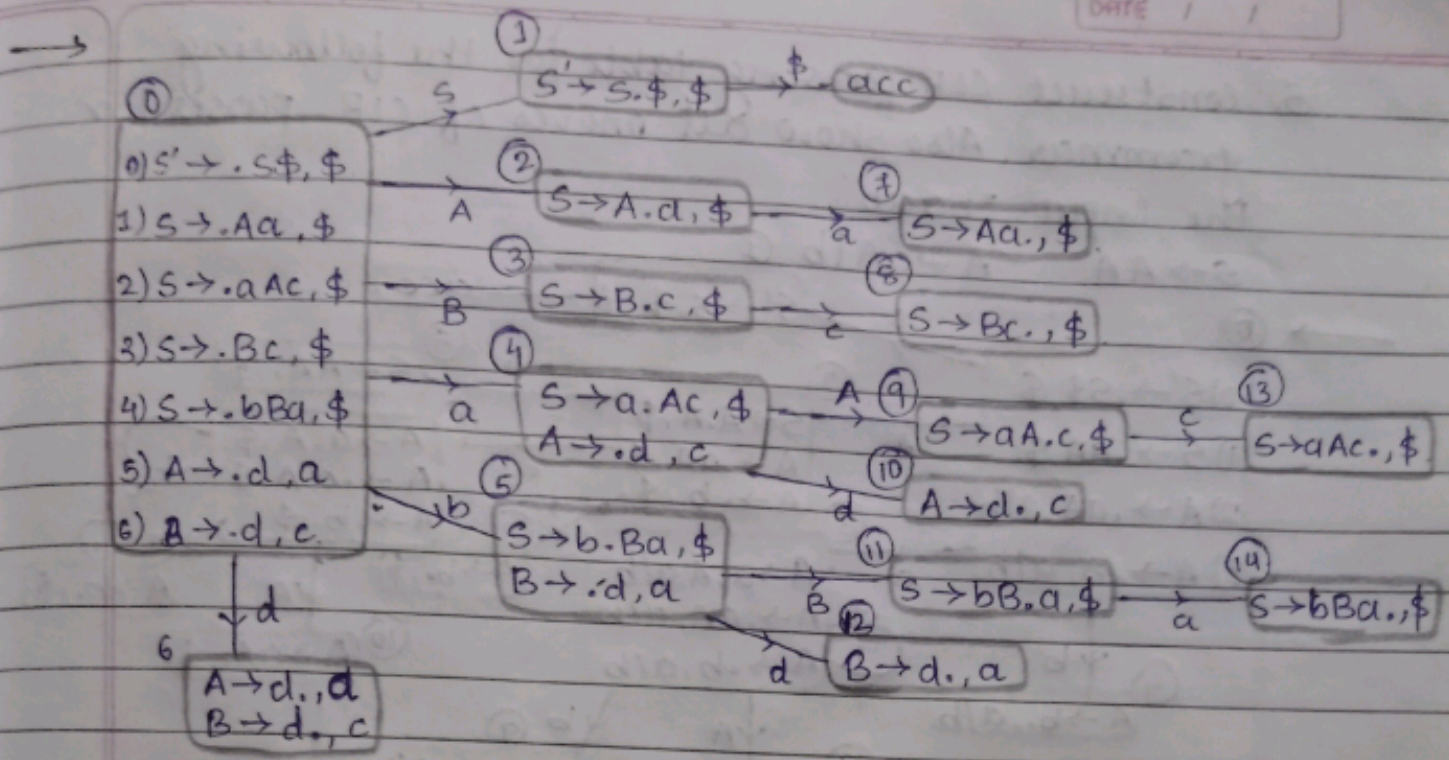
- LALR parsing table.

State	a	b	c	d	$	S	B
0		s3		s4		1	2
1					acc		
2	s5						
3				s7			6
4			s8		r5		
5					r1		
6			s9				
7	s10		r5				
8					r3		
9					r2		
10					r4		

4. Show that the following grammar is LR(1)

S → AaIaAc | Bc | bBa

A → d B → d.



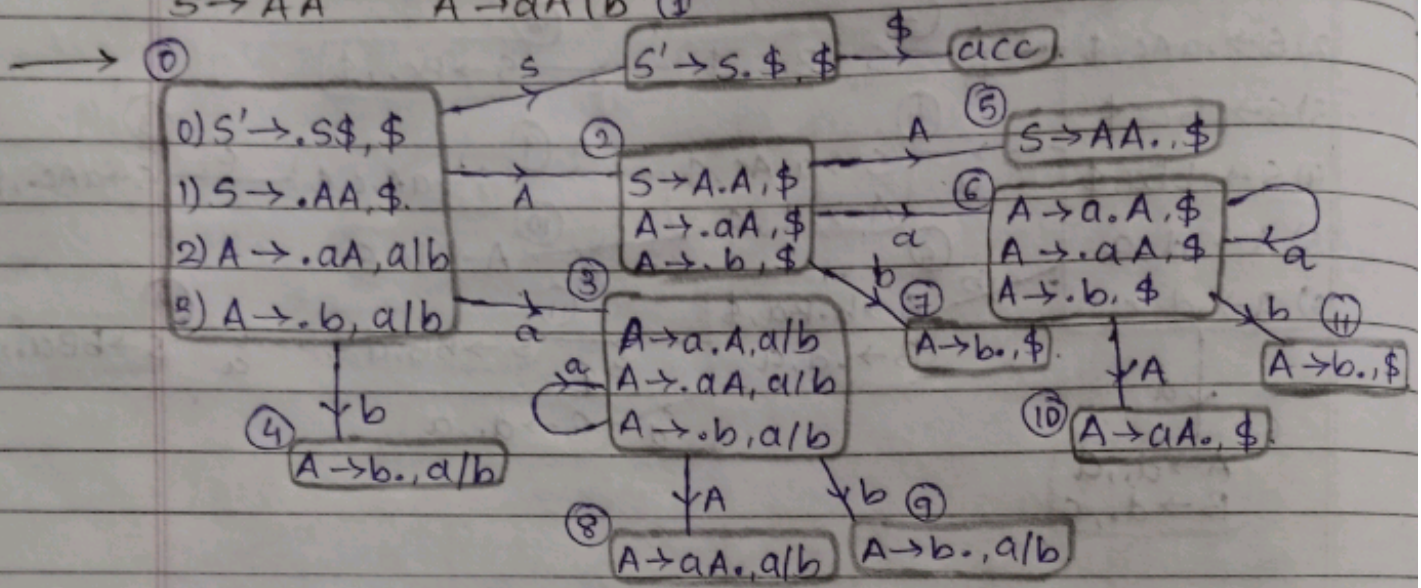
- LR(1) parsing table

State	a	b	c	d	$	S	A	B
0	S4	S5		S6		1	2	3
1					acc			
2	S7							
3			S8					
4				S10			9	
5								11
6	γ5		γ6	S12				
7					γ1			
8					γ3			
9			S13					
10			γ5					
11	S14							
12	γ6							
13					γ2			
14					γ4			

As there are no any multiple entries in parsing table, the given grammar is LR(1) grammar.

5. Construct CLR parsing table for the following grammar. Also show all moves of CLR parser for the input "baab"

S → AA A → aA | b ①



- CLR(1) parsing table.

State	a	b	$	S	A
0	S3	S4		1	2
1			accept		
2	S6	S7			5
3	S3	S9			8
4	r3	r3			
5			r1		
6	S6	S11			10
7			r3		
8	r2	r2			
9	r3	r3			
10			r2		
11			r3		

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Stack	Input	Action
$0	baab$	shift 4
$0b4	aab$	reduce 3
$0A2	aab$	Shift 6
$0A2a6	ab$	Shift 6
$0A2a6a6	b$	Shift 11
$0A2a6a6b11	$	reduce 3
$0A2a6a6A10	$	reduce 2
$0A2a6A10	$	reduce 2
$0A2A5	$	reduce 1
$0S1	$	Accept