① Given,

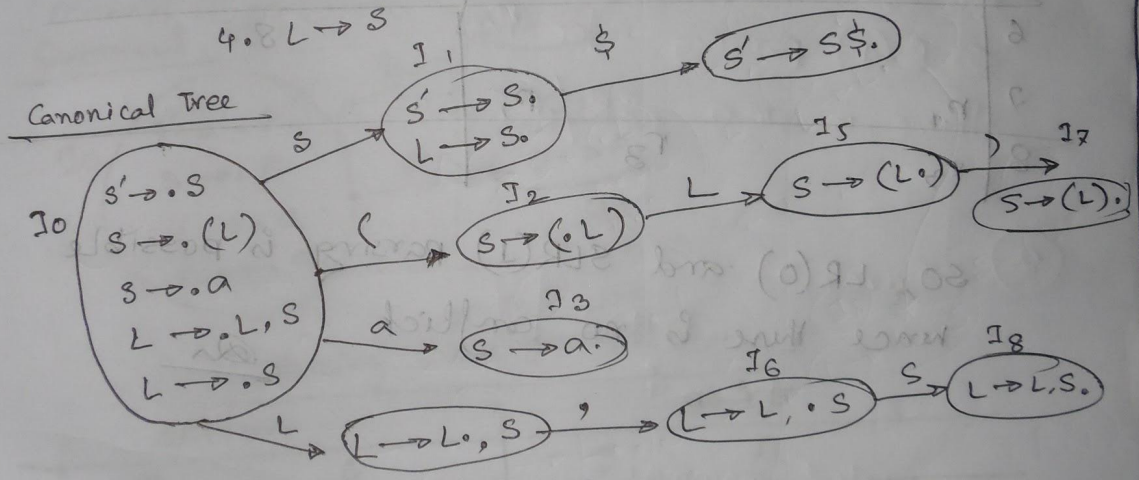
$S \to (L) \mid a$

$L \to L,S \mid S$

Augmented grammar

0. $S' \to S$
1. $S \to (L)$
2. $S \to a$
3. $L \to L,S$
4. $L \to S$

Canonical Tree



LR(0) Parsing Table

	Action					Go to	
	a	,	(	)	$	L	$
0	s_3		s_2			4	1
1					acept		
2						5	
3	r_3	r_3	r_3	r_3	r_3		
4			s_6				
5				s_7			
6						8	
7	r_1	r_1	r_1	r_1	r_1		
8	r_2	r_3	r_3	r_3	r_3		

SLR(1) Parsing Table

	Action			GOTO	
	a	(	)	$	L	S
0	s_3	s_2			4	1
1				accept		
2					5	
3	r_2			r_2		
4		s_6				
5			s_7			
6					8	
7	r_1			r_1		
8	r_3			r_3		

FOLLOW(S) = {$,)}

FOLLOW(L) = {$,)}

So, LR(0) and SLR(1) parsing is possible hence there is no conflict

② Given,

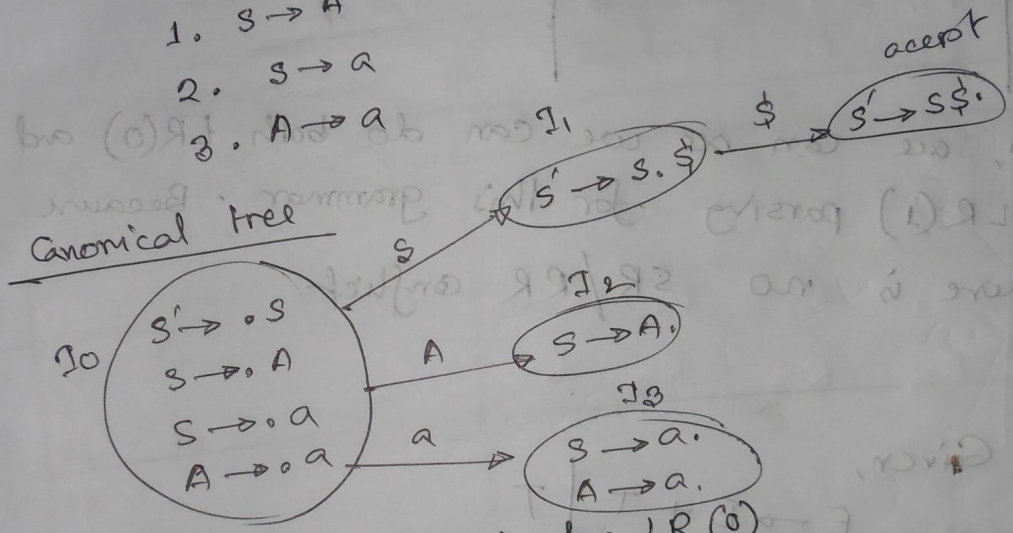
Grammar: $S \to A \mid a$

$A \to a$

augmented grammar:

0. $S' \to S$
1. $S \to A$
2. $S \to a$
3. $A \to a$

Canonical tree



Parsing table for LR(0)

	action		goto	
	a	$	S	A
0	s3		1	2
1		(accept)		
2				
3				

SLR(1) parsing table

	Action		Go to	
	a	$	S	A
0	s_3		1	2
1		accept		
2				
3				

So, we can see we can do both LR(0) and SLR(1) parsing for this grammar. Because there is no SR/RR conflict

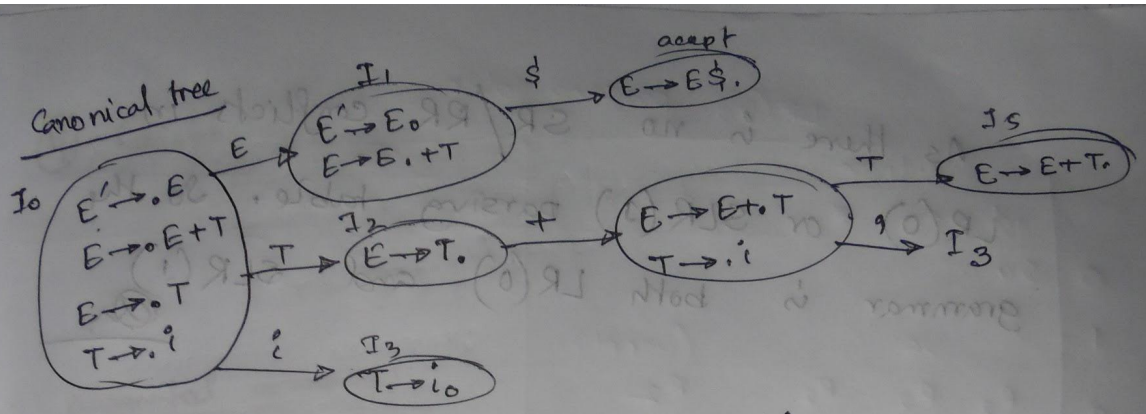
(3) Given,

$$E \to E + T \mid T$$
$$T \to i$$

augmented grammar

0. $E' \to E$
1. $E \to E+T$
2. $E \to T$
3. $T \to i$

Canonical tree



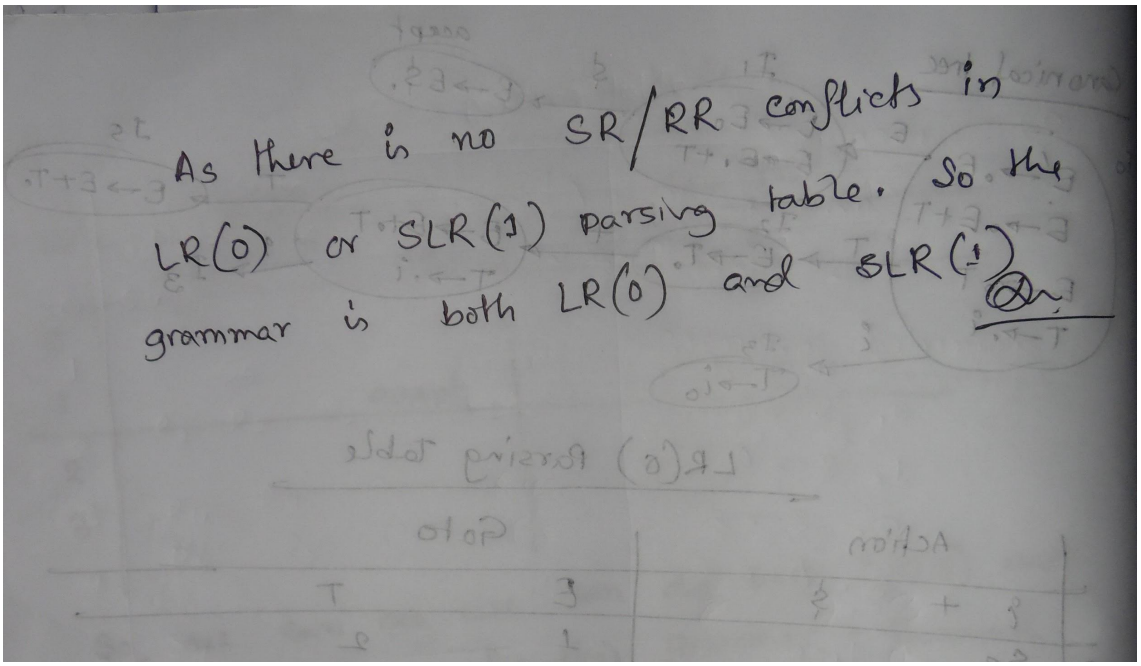
LR(0) Parsing Table

	Action			Goto	
	i	+	$	E	T
0	s3			1	2
1		s4	accept		
2	r2	r2	r2		
3	r3	r3	r3		5
4	s3				
5	r1	r2	r1		

FOLLOW(E) = {+, $}
FOLLOW(T) = {+, $}

SLR(1) parsing table

	Action			Goto	
	i	+	$	E	T
0	s3			1	2
1		s4	accpt		
2		r2	r2		
3		r3	r3		5
4	s4				
5		r1	r1		


As there is no SR/RR conflicts in
LR(0) or SLR(1) parsing table. So the
grammar is both LR(0) and SLR(1)

④ Given,

$E \rightarrow E + T \mid T$

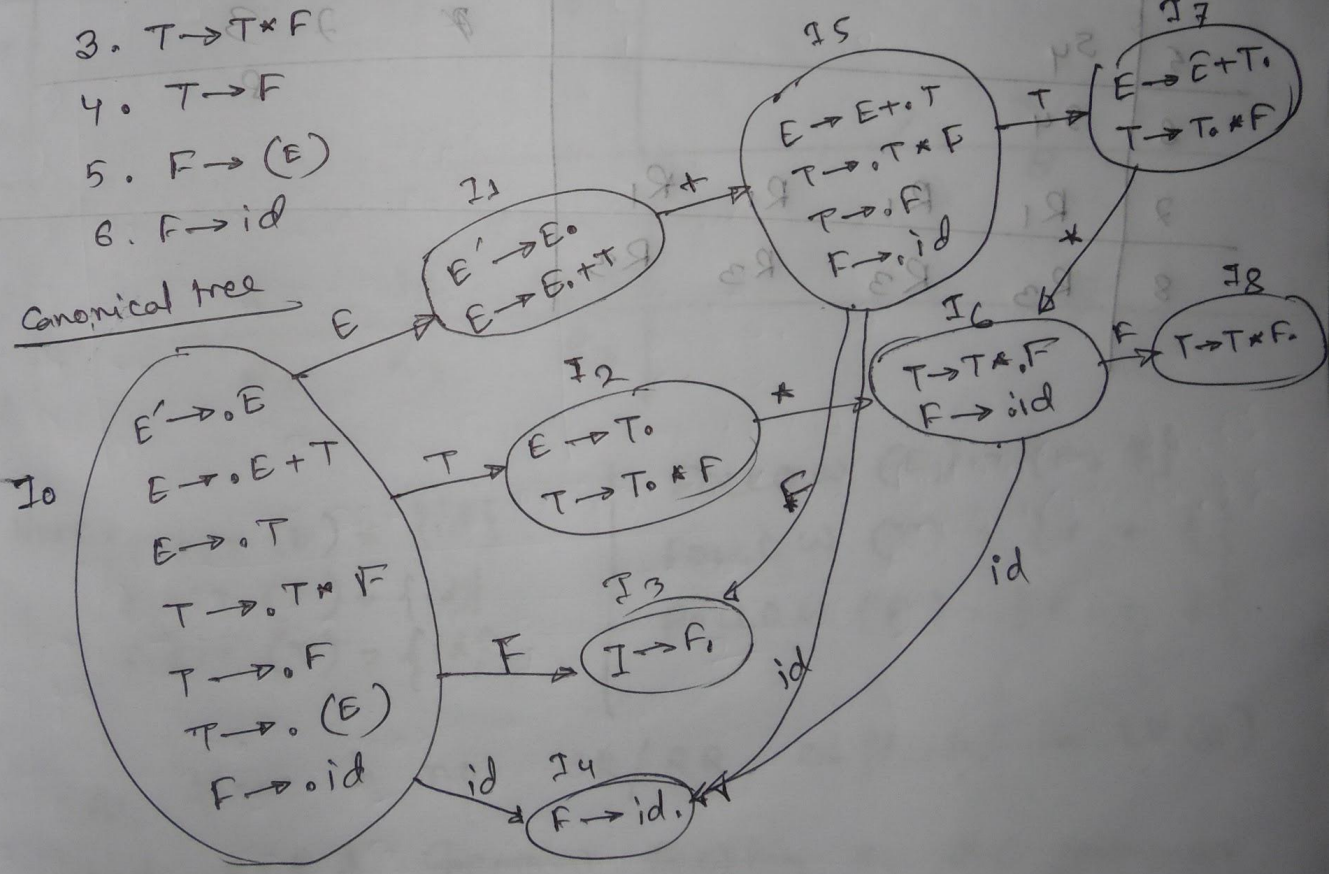
$T \rightarrow T * F \mid F$

$F \rightarrow (E) \mid id$

augmented grammar:

0. $E' \rightarrow E$
1. $E \rightarrow E+T$
2. $E \rightarrow T$
3. $T \rightarrow T*F$
4. $T \rightarrow F$
5. $F \rightarrow (E)$
6. $F \rightarrow id$

Canonical tree



LR(0) parsing table

	Action				Go to		
	id	+	*	$	E	T	F
					1	2	3
0	S4						
1		S5		(accept)			
2	R2	R2	R2	R2			
3	R4	R4	R4	R4			
4	R5	R5	R5	R5			
5	S4						
6	S4						
7	R1	R1	R1	R1			
8	R3	R3	R3	R3			

SLR(1) Parsing Table

	Action				Go to		
	id	+	*	$	E	T	F
0	S4				1	2	3
1		S5		(accept)			
2		R2	S6	R2			
3		R4	R4	R4			
4		R5	R5	R5			
5	S4				7	3	
6	S4					8	
7		R1	S6	R1			
8		R3	R3	R3			

Here, FIRST (E) = {id}
FIRST (F) = {id}
FIRST (T) = {id}

FOLLOW (E) = {+, $}
FOLLOW (T) = {*, +, $}
FOLLOW (F) = {*, +, $}

As there is no SR/RR conflicts in LR(0) and SLR 1 Grammar parsing so the grammar is both LR(0) and SLR(1)

Q.