

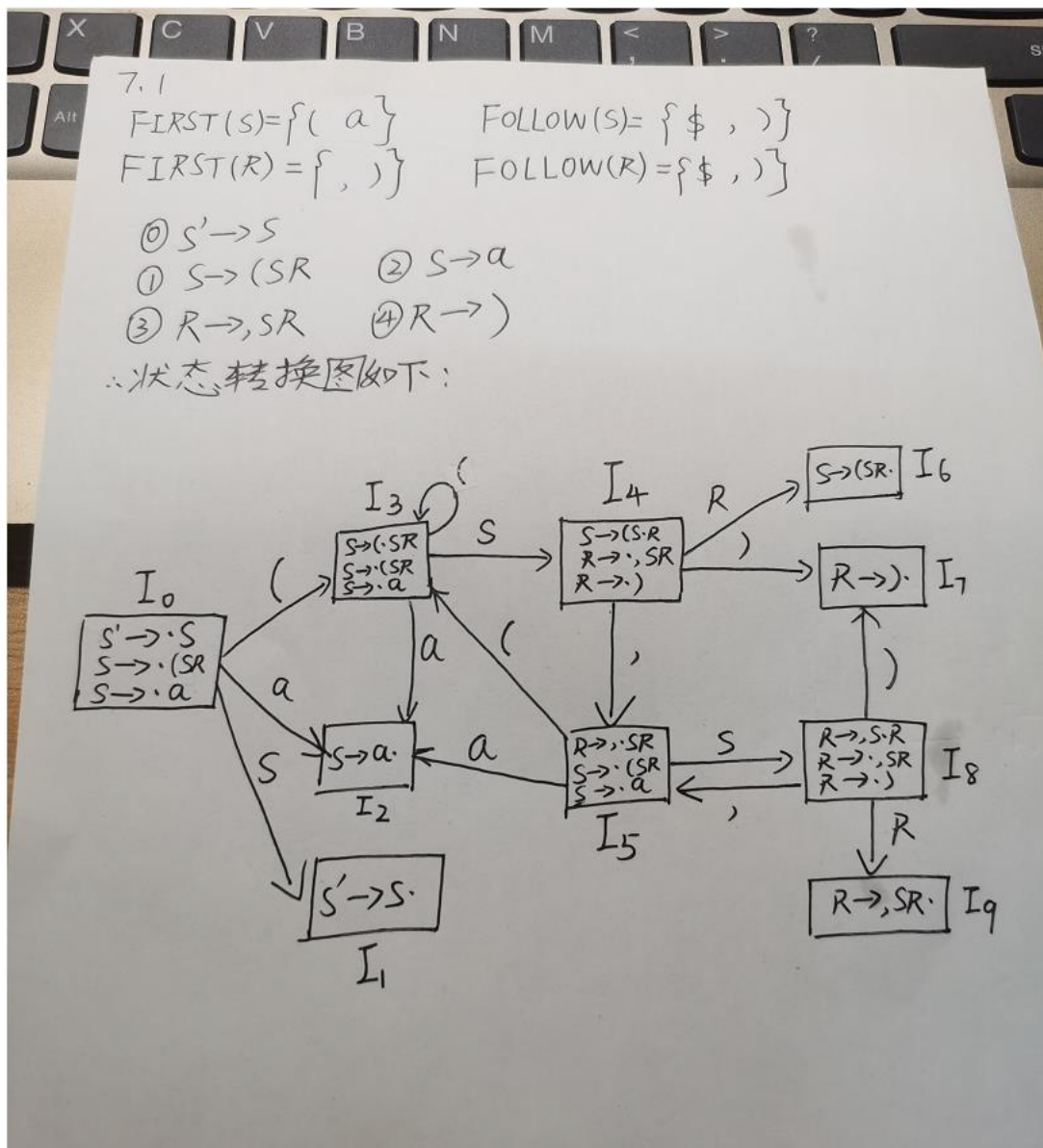
Exercise 7.1

- Consider the grammar

$$S \rightarrow (SR \mid a$$

$$R \rightarrow ,SR \mid)$$

- Try to construct an SLR(1) parsing table for the grammar, and see if there are conflicts in the parsing table.



State	ACTION					GOTO	
	(,	a)	\$	S	R
0	S3		S2			1	
1					acc		
2		r2		r2	r2		
3	S3		S2			4	
4		S5		S7			6
5	S3		S2			8	
6		r1		r1	r1		
7		r4		r4	r4		
8		S5		S7			
9		r3		r3	r3		

Exercise 7.2

- Consider the grammar

$$S \rightarrow S a b \mid a R$$

$$R \rightarrow S \mid a$$

Is the grammar an SLR(1) grammar? and why?

7.2

(0) $S' \rightarrow S$
 (1) $S \rightarrow Sab$ (2) $S \rightarrow aR$
 (3) $R \rightarrow S$ (4) $R \rightarrow a$

$FIRST(S) = \{a\}$ $FOLLOW(S) = \{a \$\}$
 $FIRST(R) = \{a\}$ $FOLLOW(R) = \{a \$\}$

状态转换图如下:

在构造ACTION表时, 对于 I_4 有: ① 对于 $R \rightarrow S$, 因为 $FOLLOW(R) = \{a \$\}$, 所以 $ACTION[4, a] = r3$
 ② 对于 $S \rightarrow S.ab$, 因为 I_4 读取 a 后到 I_3 , 故 $ACTION[4, a] = s3$
 所以 $ACTION[4, a] = r3/s3$, 有冲突, 所以该语法非SLR(1)

Exercise 7.3

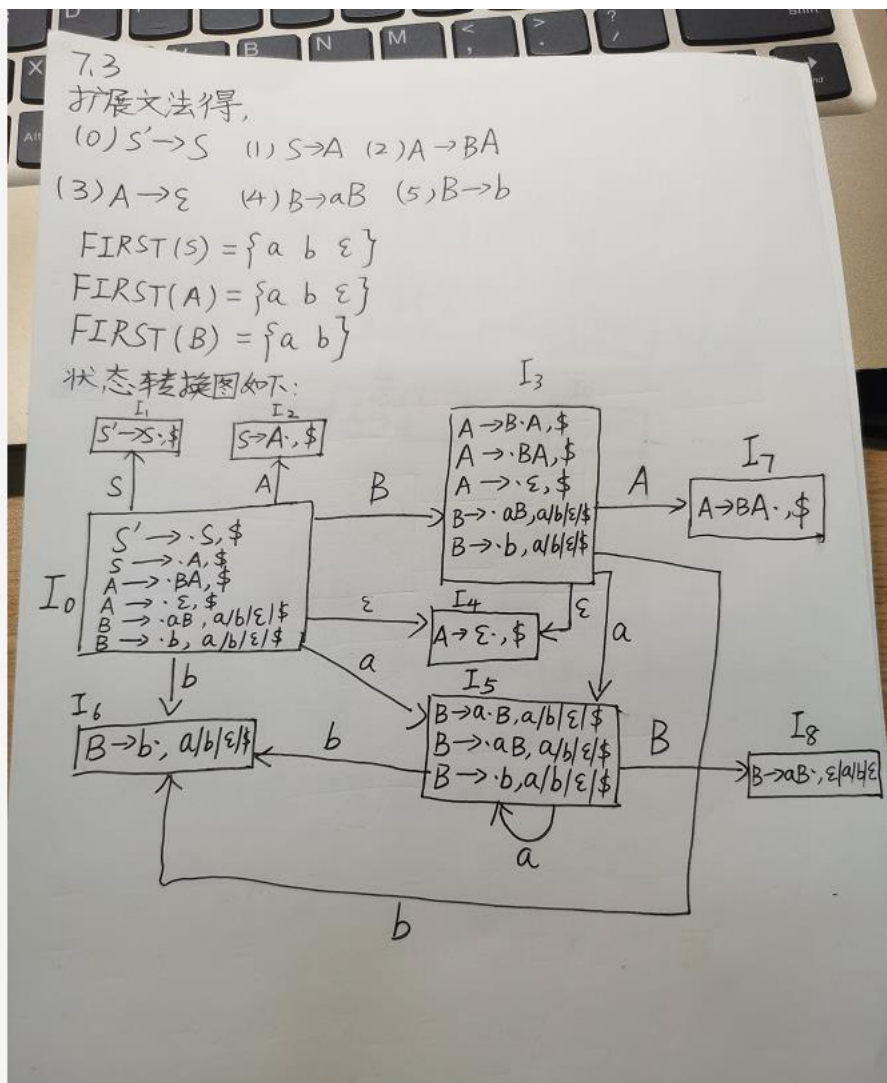
Consider the grammar

$$S \rightarrow A$$

$$A \rightarrow BA \mid \varepsilon$$

$$B \rightarrow aB \mid b$$

- Prove that the grammar is an LR(1) grammar.
- Construct an LR(1) parsing table for the grammar.
- Show the detailed parsing procedure for the sentence **abab**, following the style in slides of this lecture.



State	ACTION				GOTO		
	a	b	ϵ	\$	S	A	B
0	S5	S6	S7		1	2	3
1				acc			
2				r1			
3	S5	S6	S4			7	3
4				r3			
5	S5	S6					8
6	r5	r5	r5	r5			
7				r2			
8	r4	r4	r4	r4			

由 LR(1)分析表可知不存在冲突，所以是 LR(1)文法

Step	Symbol	State	Input	Reference	Action	Output
1	\$	0	abab\$	$a[0,a]=S5$	shift	
2	\$ a	05	bab\$	$a[5,b]=S6$	shift	
3	\$ ab	056	ab\$	$a[6,a]=r5$ $g[5,b]=8$	reduce	$B \rightarrow b$
4	\$ aB	058	ab\$	$a[8,a]=r4$ $g[5,B]=3$	reduce	$B \rightarrow aB$
5	\$ B	03	ab\$	$a[3,a]=S5$	shift	
6	\$ Ba	035	b\$	$a[5,b]=S6$	shift	
7	\$ Bab	0356	\$	$a[6,\$]=r5$ $g[5,B]=8$	reduce	$B \rightarrow b$
8	\$ BaB	0358	\$	$a[8,\$]=r4$ $g[3,B]=3$	reduce	$B \rightarrow aB$
9	\$ BB	033	ϵ \$	$a[3,\epsilon]=S4$	shift	
10	\$ BB ϵ	0334	\$	$a[4,\epsilon]=13$ $g[3,A]=7$	reduce	$A \rightarrow \epsilon$
11	\$ BBA	0337	\$	$a[7,\$]=r2$ $g[3,A]=7$	reduce	$A \rightarrow BA$
12	\$ BA	037	\$	$a[7,\$]=r2$ $g[0,A]=2$	reduce	$A \rightarrow BA$
13	\$ A	02	\$	$a[2,\$]=r1$ $g[0,S]=1$	reduce	$S \rightarrow A$
14	\$ S	01	\$	$a[1,\$]=acc$	accept	

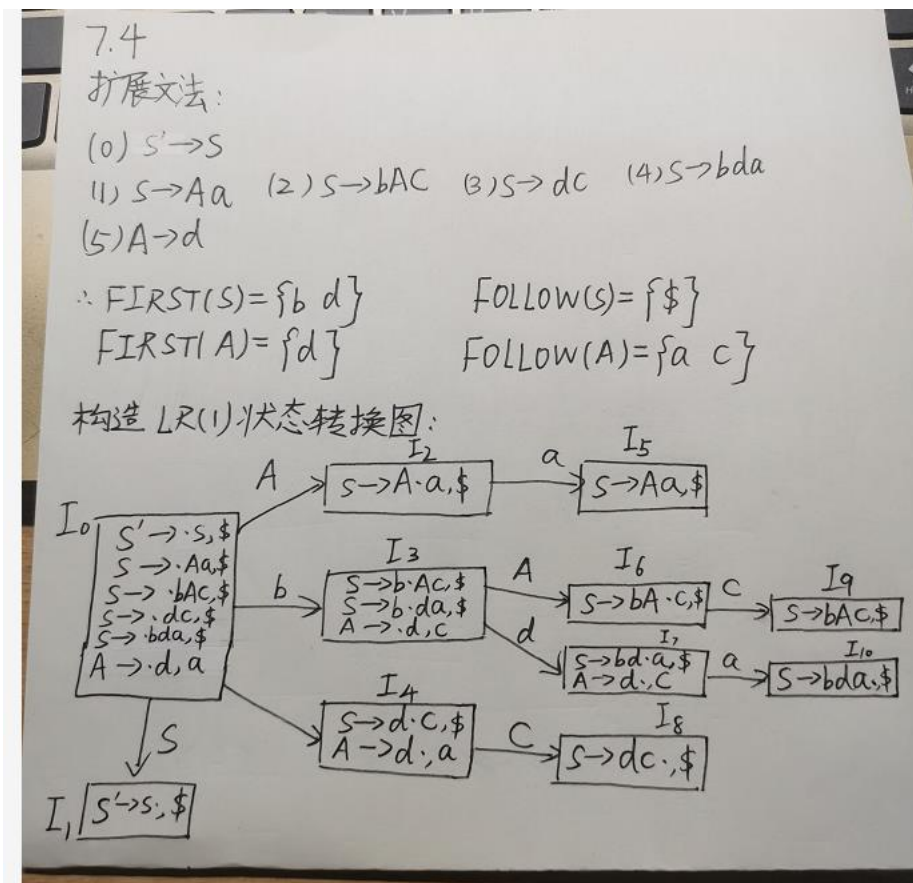
Exercise 7.4*

- (DBv2, pp.278, ex.4.7.4) Show that the grammar

$$S \rightarrow Aa \mid bAc \mid dc \mid bda$$

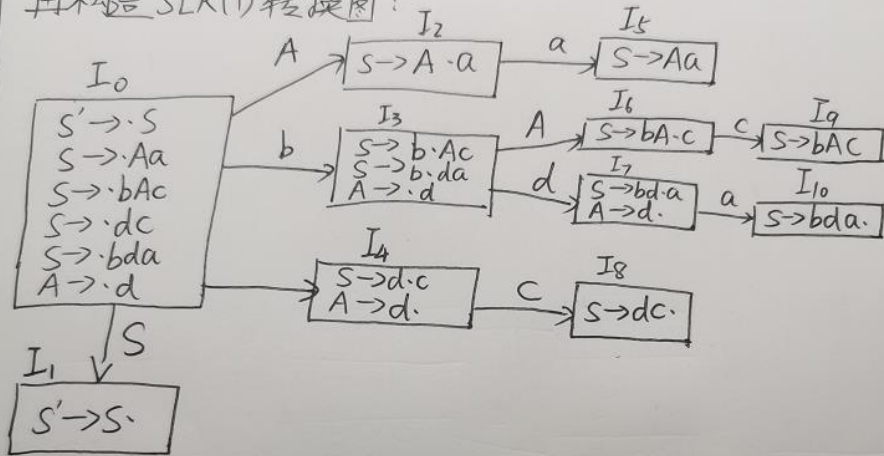
$$A \rightarrow d$$

is LALR(1) but not SLR(1).



∴以上LR(1)转换图中无可合并的同心项目集,且不存在移进—归约冲突或归约冲突,所以是LALR(1)文法

再构造SLR(1)转换图:



对于状态 I_4 ,存在移进—归约冲突: $FOLLOW(A) = \{ac\}$ 且
 $A \rightarrow d$, $\therefore ACTION[4, a] = r5$, $S \rightarrow d \cdot c$, $\therefore ACTION = s8$
 \therefore 不是SLR(1)文法

∴是LALR(1), 不是SLR(1)