Mansoura University
Faculty of Computers and Information Sciences
Department of Computer Science
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[CS422p] Compiler Construction

Grade: Fourth grade

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Compiler construction

Syntax Analysis

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Syntax Analysis

Bottom UP Parsing

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- Look a head LR(1) PARSER LALR(1):

I. Augment the grammar.

II. Draw DFA using LR(1) items.

III. Constructing the LALR(1) parse table.

LALR(1) –SLR(1)Parsing – question 1.

Let grammar G be given by:

S'–S

S–Aa | bAc | dc | bda

A–d

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

Solution: NOTE: LR(1) ITEMS=LR(0)ITEMS+LOOK AHEAD

Step-1: Augment The Grammar and add LR(1) items:

0: S' →.S,$

1: S → .Aa,$

2: S → .bAc,$

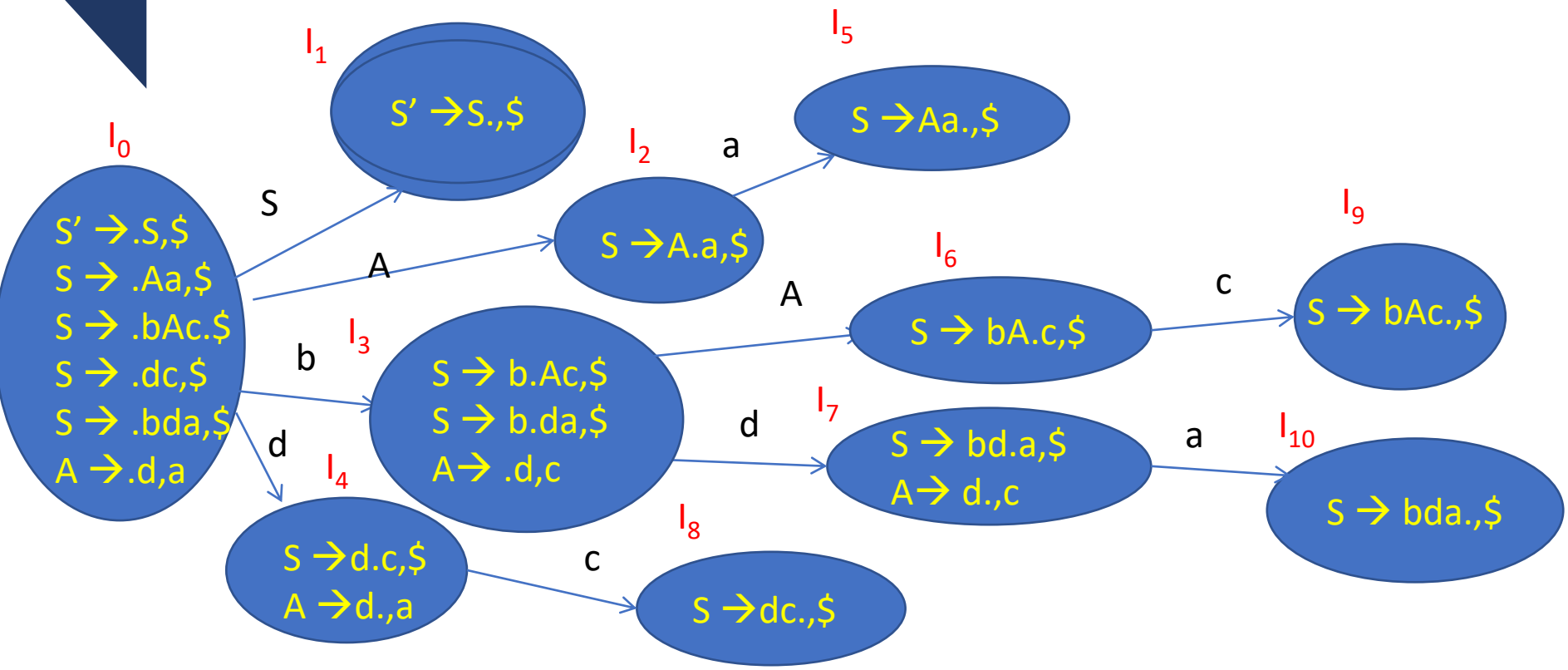
3: S → .dc,$

4: S →.bda,$

5: A→.d,a

LALR(1)-SLR(1) Parsing – PROVING THAT G is .

Step -2 : Draw DFA using LR(1) items .



LALR(1)-SLR(1) Parsing – PROVING THAT G is LALR(1) .

States	Actions					Go To	
	a	b	c	d	$	S	A
I_0		S3		S4		1	2
I_1					ACC		
I_2	S5						
I_3				S7			6
I_4	R5		S8				
I_5					R1		
I_6			S9				
I_7	S10		R5				
I_8					R3		
I_9					R2		
I_{10}					R4		

Step -3 : Construct the LR(1) parsing table .

NOTE : add the reduce actions to the look ahead (terminals) of the rule.

LALR(1)-SLR(1) Parsing – PROVING THAT G is LALR(1) .

We notice that the final LALR(1) parsing table is the same as LR(1) without merging the states with common LR(0) items but different look ahead. Thus, the given grammar is LALR(1).

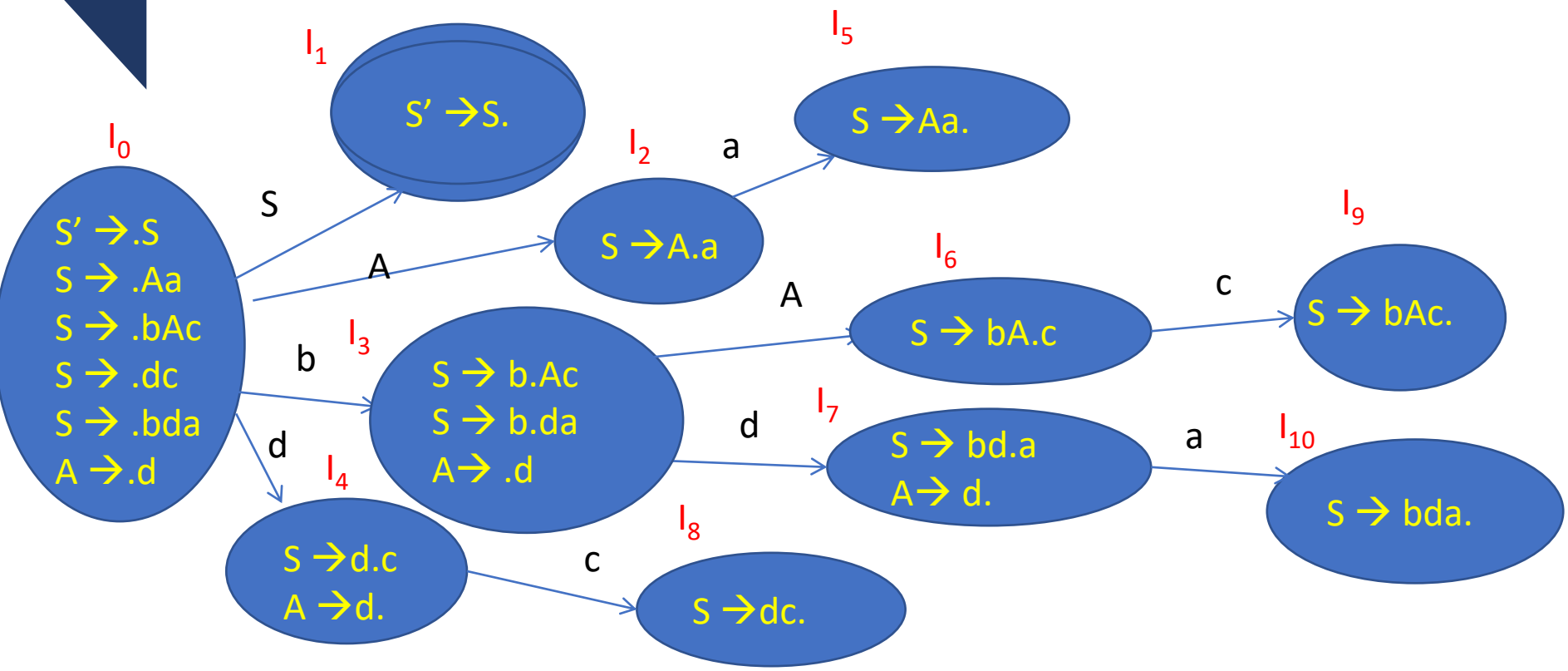
LALR(1)-SLR(1) Parsing – PROVING THAT G is NOT SLR(1) .

Follow the procedures mentioned before(in the previous lab) for constructing the state diagram (DFA) for the SLR(1) parsing using the LR(0) items .the grammar will be as follows:

0: S'→.S
1: S → .Aa
2: S → .bAc
3: S → .dc
4: S →.bda
5: A→.d

LALR(1)-SLR(1) Parsing – PROVING THAT G is not SLR(1) .

Step -2 : Draw DFA using LR(0) items .



LALR(1)-SLR(1) Parsing – PROVING THAT G is NOT SLR(1) .

Since there is a shift–reduce conflict in the row number 4,and column 'c',because c belongs to follow(A)={a,c} . Also ,there is another shift-reduce conflict in the row number 7,and column 'a' . because a belongs to follow(A)={a,c}. Hence the grammar is not SLR(1).

SYNTAX ANALYSIS

Thanks