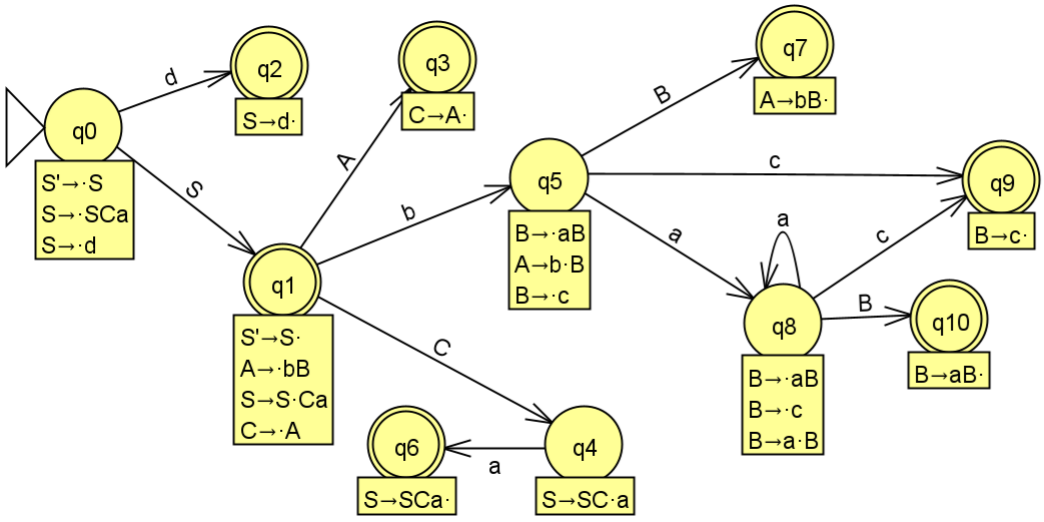
Compsci 334 **Classwork 5** **Oct 17 or 22, 2024**

10 pts

1. Consider this grammar where a new start symbol has already been added, and the DFA with marked rules is shown for building the LR Parse table for this grammar.

S' → S
S → SCa | d
A → bB
B → aB | c
C → A



(a) In processing some string, suppose you have reached the state q_3. After processing the reduce operation $C \to A$ which possible state(s) could you be in? Give the path(s) that reached that state(s). q4 path back to q1, forward to q4

(b) In processing some string, suppose you have reached the state q_{10}. After processing the reduce operation $B \to aB$ which possible state(s) could you be in? Give the path(s) that reached that state(s). q7 ← q5 or q8 → q10

(c) In processing some string, suppose you have reached the state q_6. After processing the reduce operation $S \to SCa$ which possible state(s) could you be in? Give the path(s) that reached that state(s). q1 back to q0, forward to q1

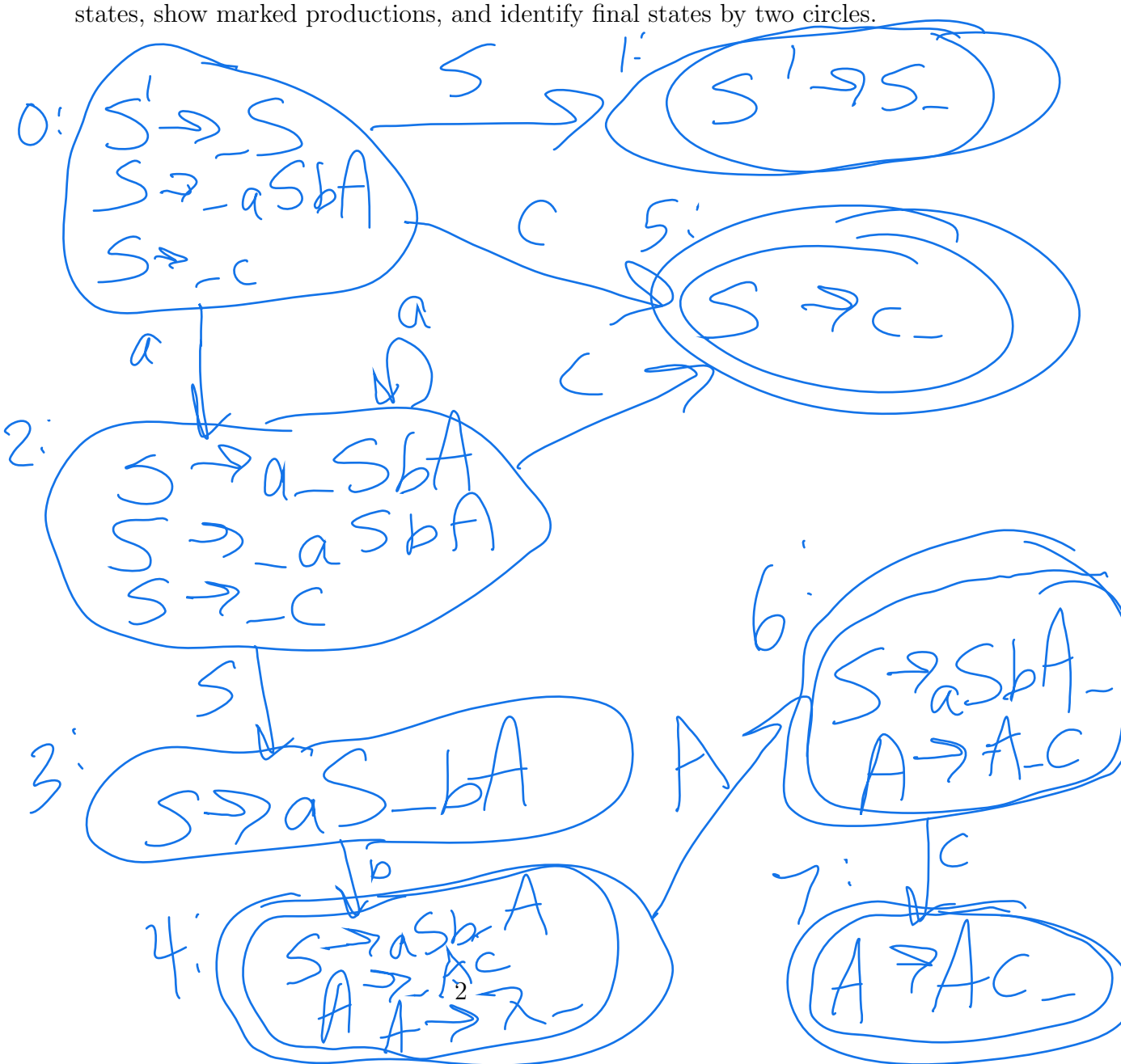
2. Construct the LR parsing table for the following grammar (DO NOT change the grammar.) A new start symbol S' and production have already been added to the grammar.

0) S' → S 1) S → aSbA 2) S → c
3) A → Ac 4) A → λ

(a) Calculate the FIRST and FOLLOW sets of variables.

	FIRST	FOLLOW
S	a, c	$, b
A	λ, c	c, b, $

(b) Construct the transition diagram of the DFA that models the stack. Number the states, show marked productions, and identify final states by two circles.



(c) Construct the LR parse table that corresponds to the transition diagram drawn in part b. (Note: all the rows and columns given may not be needed. **If there are multiple items for an entry, write all in the entry.**)

	a	b	c	$	S	A			
0	s2		s5		1				
1				acc					
2	s2		s5		3				
3		s4							
4		r4	r4	r4		6			
5		r2		r2					
6		r1	s7	r1					
7		r3	r3	r3					
8									
9									
10									