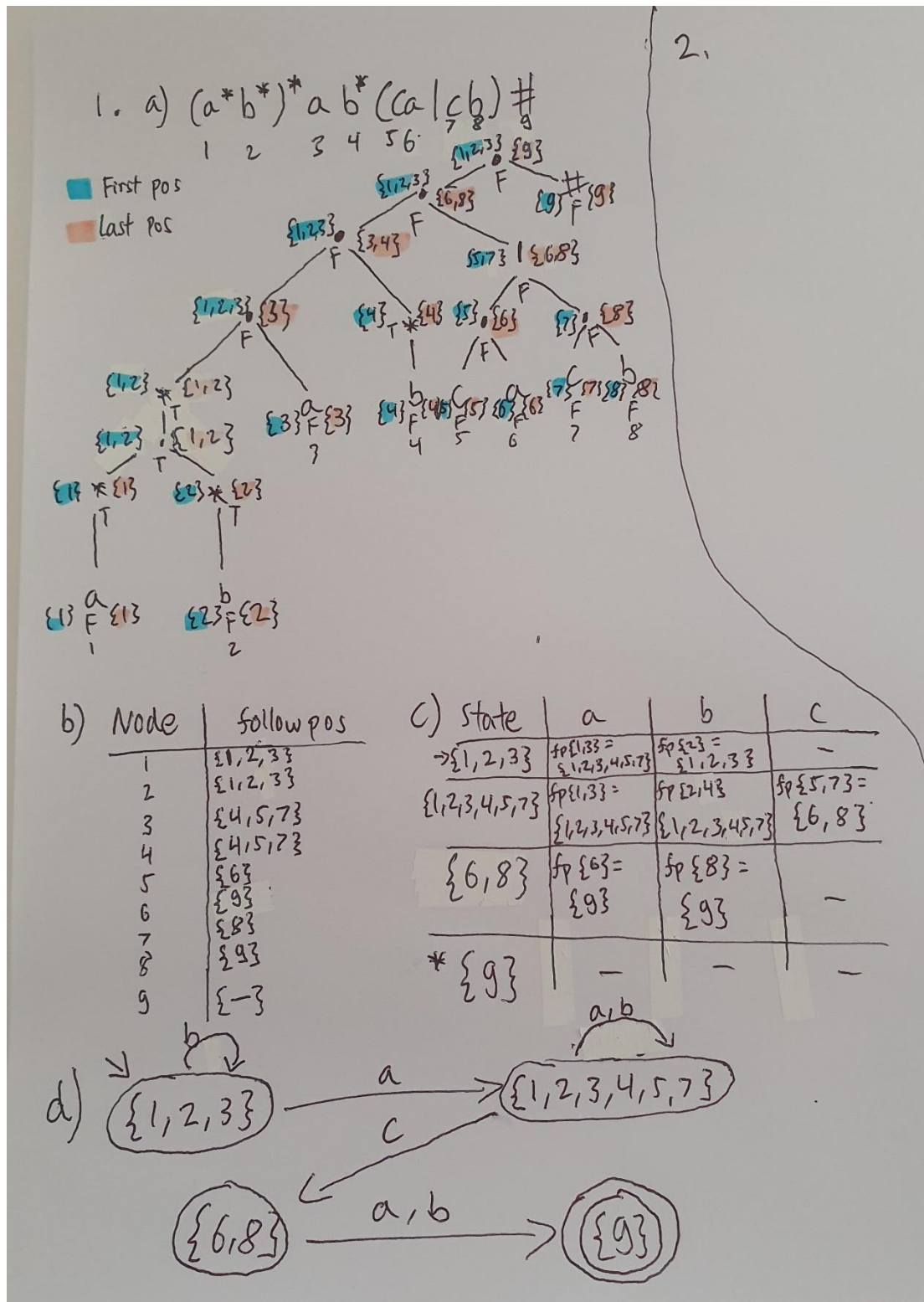
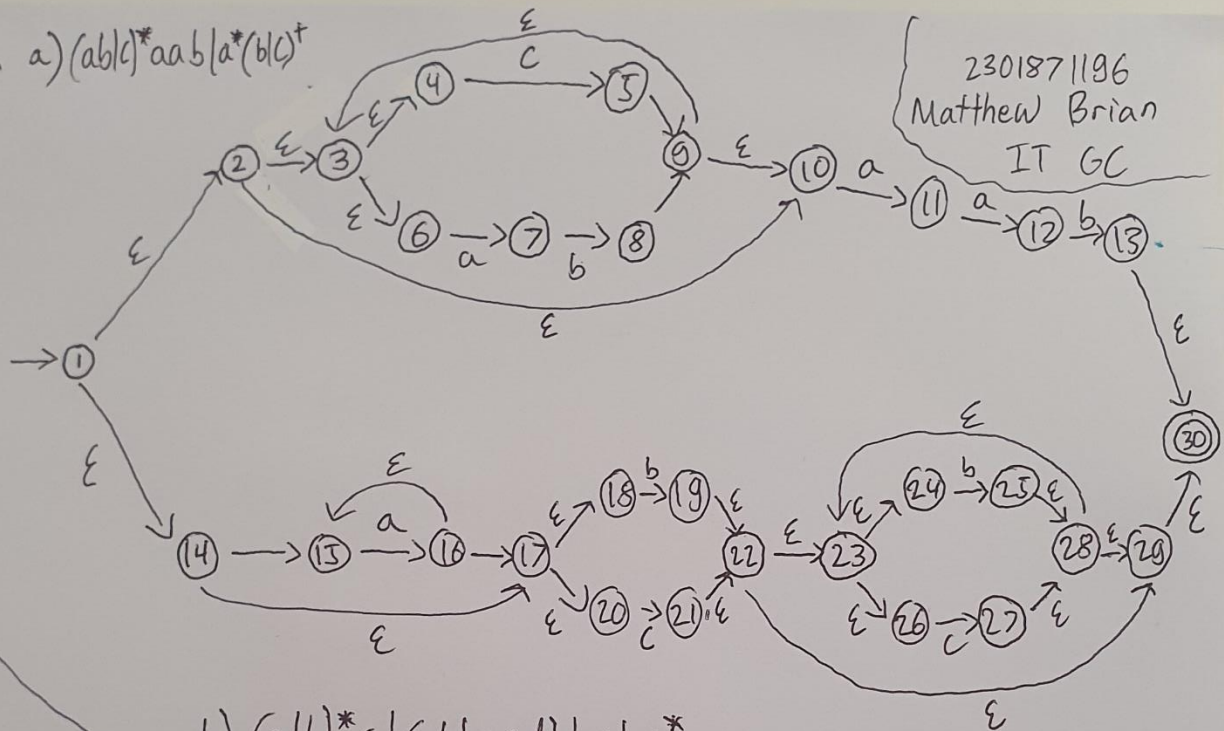


1.



2.

2. a)  $(abc)^*aab/a^*(bc)^+$



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IT GC

b)  $(a|b)^*c|(ab|acd)|abc^*$

$S = Ac|B|abc$

$A = DA|ε$

$D = a|b$

$B = ab|acd$

$C = cC|ε$

	C
33	-
for {5,7,3} =	
{5,7}	{6,8}
-	-
-	-

3.

3. a)  $S \rightarrow SAB \mid aB$  ✓ Left Recursion  
 $S \rightarrow aBS'$  X Left Factoring  
 $S' \rightarrow ABS' \mid \epsilon$

$A \rightarrow a \mid bA$  } X Left Recursion  
 $B \rightarrow aB \mid \epsilon$  } X Left Factoring

b)  $S \rightarrow aAB \mid aS \mid Aa$  X Left Recursion  
 $S \rightarrow aS' \mid Aa$  ✓ Left Factoring  
 $S' \rightarrow AB \mid S$

$A \rightarrow Sc \mid Ab \mid d$  ✓ Left Recursion  
 $A \rightarrow dA' \mid Sc$  X Left Factoring  
 $A' \rightarrow bA' \mid \epsilon$

$B \rightarrow bc \mid bd$  X Left Recursion  
 $B \rightarrow bB'$  ✓ Left Factoring  
 $B' \rightarrow c \mid d$

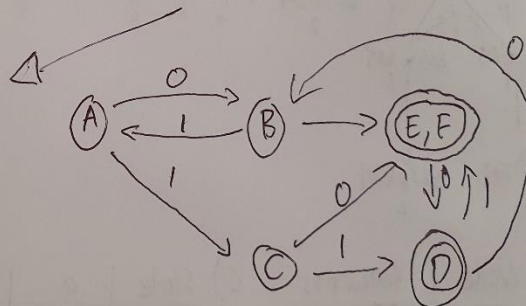
4.

#### 4. Minimization Using Partition

Group	state	0	1
Group 1	A	B(G1)	C(G1)
	B	E*(G2)	A(G1)
	C	F*(G2)	D*(G2)
	D*	B(G1)	E*(G2)
Group 2	E*	D*(G2)	-
	F*	D*(G2)	-

Group	state	0	1
Group 1	A	B(G2)	C(G3)
Group 2	B	E*(G4)	A(G1)
Group 3	C	F*(G4)	D*(G4)
Group 4	D*	B(G2)	E*(G4)
	E*	D*(G4)	-
	F*	D*(G4)	-

Group	state	0	1
Group 1	A	B(G2)	C(G3)
Group 2	B	E*(G5)	A(G1)
Group 3	C	F*(G5)	D*(G4)
Group 4	D*	B(G2)	E*(G4)
Group 5	E*	D*(G4)	-
	F*	D*(G4)	-



5.

5. a)  $A \rightarrow aED \mid CF$   
 $B \rightarrow aE \mid \epsilon$   
 $E \rightarrow dB \mid baB$   
 $D \rightarrow cF$   
 $F \rightarrow eBF \mid \epsilon$

}  $\times$  Left Recursion  
 $\times$  Left Factoring

	First	Follow
$A \rightarrow aED \mid CF$	$\{a, c\}$	$\{\$, \}$
$B \rightarrow aE \mid \epsilon$	$\{a, \epsilon\}$	$\{\$, e, c\}$
$E \rightarrow dB \mid baB$	$\{d, b\}$	$\{\$, c, e\}$
$D \rightarrow cF$	$\{c\}$	$\{\$\}$
$F \rightarrow eBF \mid \epsilon$	$\{e, \epsilon\}$	$\{\$\}$

b)

	a	b	c	d	e	\$
A	aED		cF			
B	aE		$\epsilon$		$\epsilon$	$\epsilon$
E		bdB		dB		
D			cF			
F					eBF	$\epsilon$

c)

Stack	Input Buffer	Output
A\$	adacce\$	$A \rightarrow aED$
aED\$	adacce\$	pop a
ED\$	dacce\$	$E \rightarrow dB$
dB\$	dacce\$	pop d
B\$	acce\$	$B \rightarrow aE$
aED\$	acce\$	pop a
ED\$	cce\$	{INVALID}