Compiler Design Mid Sem

Sayam Kumar
S20180010158

Q1

S → S∨B | B
B → B∧C | C
C → ¬C | (S) | a | b | c

① Remove left recursion

S → BD
D → ∨BD | ε
B → CE
E → ∧CE | ε
C → ¬C | (S) | a | b | c

② Left factoring → grammar is already left factored

③ FIRST follow

		First	Follow
S	S → BD	¬, (, a, b, c	$,)
D	D → ∨BD | ε	∨, ε	$,)
B	B → CE	¬, (, a, b, c	∨, $,)
E	E → ∧CE | ε	∧, ε	∨, $,)
C	C → ¬C | (S) | a | b | c	¬, (, a, b, c ("(" ← brace)	∧, ∨, $,)

④

	¬	a	b	c	(	)	$	∨	∧
S	S→BD	S→BD	S→BD	S→BD	S→BD				
D						D→ε ~~D→∨BD~~	D→ε ~~D→∨BD~~	D→∨BD	
B	B→CE	B→CE	B→CE	B→CE	B→CE				
E								E→∧CE	E
C									

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	¬	a	b	c	(	)	$	∧	∨
S	S→BD	S→BD	S→BD	S→BD	S→BD				
D						D→ϵ	D→ϵ		D→∨BD
B	B→CE	B→CE	B→CE	B→CE	B→CE				
E						E→ϵ	E→ϵ	E→∧CE	E→ϵ
C	C→¬C	S→a	C→b	S→C	C→(S)				

Grammar is LL1

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Sat|Sun|Mon|Tue|Wed

(5) ~~a∧(~~ $a \wedge (\neg b \vee c)$

Match	Stack	Input
	S$	a∧(¬bvc)$
	BD$	a∧(¬bvc)$
	CED$	a∧(¬bvc)$
(a)	aED$	a∧(¬bvc)$
(∧)	∧CED$	∧(¬bvc)$
(c)	(S)ED$	(¬bvc)$
	S)ED$	¬bvc)$
	BD)ED$	¬bvc)$
	CED)ED$	¬bvc)$
(¬)	¬CED)ED$	¬bvc)$
(b)	bED)ED$	bvc)$
	D)ED$	vc)$
(v)	vBD)ED$	vc)$
	CED)ED$	c)$
(c)	cED)ED$	c)$
	)$	)$

Matches

Yes, string is accepted by grammar

ED goes to ϵ

Q-2 $S \to AS \mid acS \mid c$

$A \to ab$

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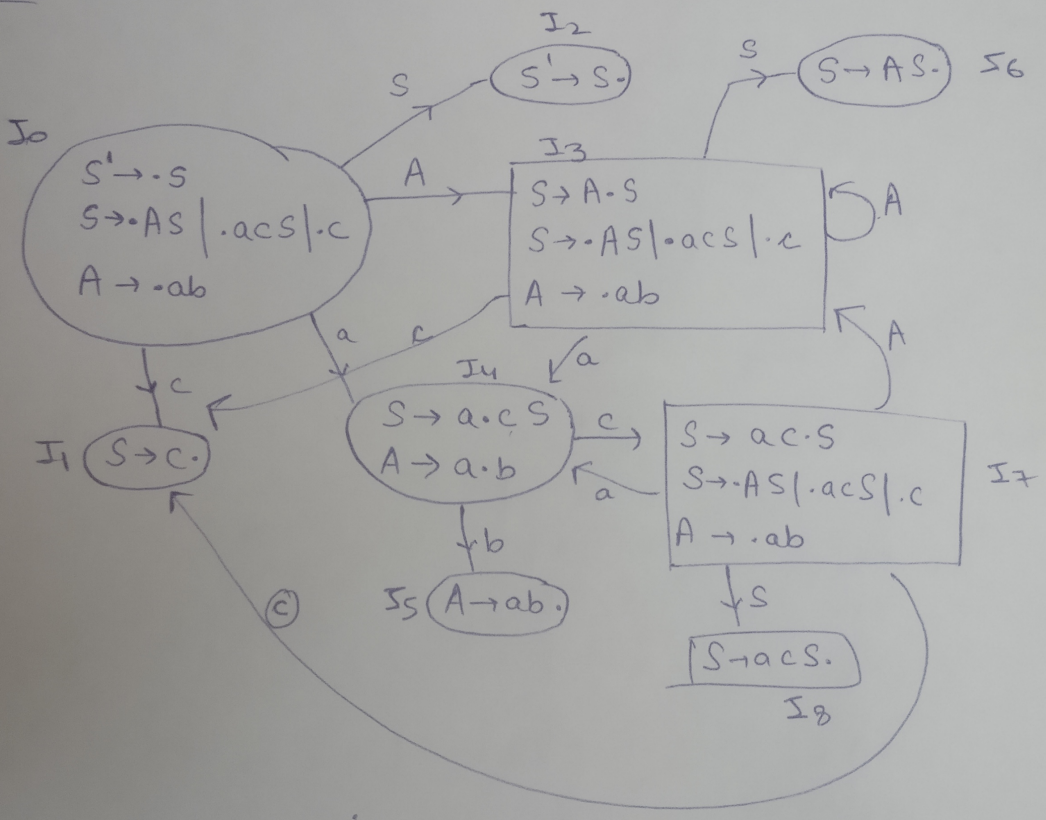
Constructing canonical collection of LR(0) item.

$S' \to S$
$S \to AS \mid acS \mid c$
$A \to ab$

$S' \to S$ (R1)
$S \to AS$ (R2)
$S \to acS$ (R3)
$S \to c$ (R4)
$A \to ab$ (R5)



① The grammar is LR(0) because there are no Shift-Reduce or Reduce-Reduce conflicts.

② The grammar is ~~SR1~~ SLR 1 because the grammar is already LR(0).

Q2 Part 3

String abaccb

Constructing parsing table (SLR1)

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	a	c	$	S	A	b
I_0	S_4	S_1		2	3	
I_1			r_4			
I_2			accept			
I_3	S_4	S_1		6	3	
I_4		S_7				S_5
I_5	r_5	r_5				
I_6			r_2			
I_7	S_4	S_1		8	3	
I_8			r_3			

SLR Parsing table

Stack	Symbol	Input
0	$	abaccb$
04	$a	baccb$
045	$ab	accb$
03	$A	accb$
034	$Aa	ccb$
0347	$Aac	cb$
03471	$Aacc	b$

Stuck

Input is not accept by SLR 1 grammar

(IV) Grammar is SLR(1).

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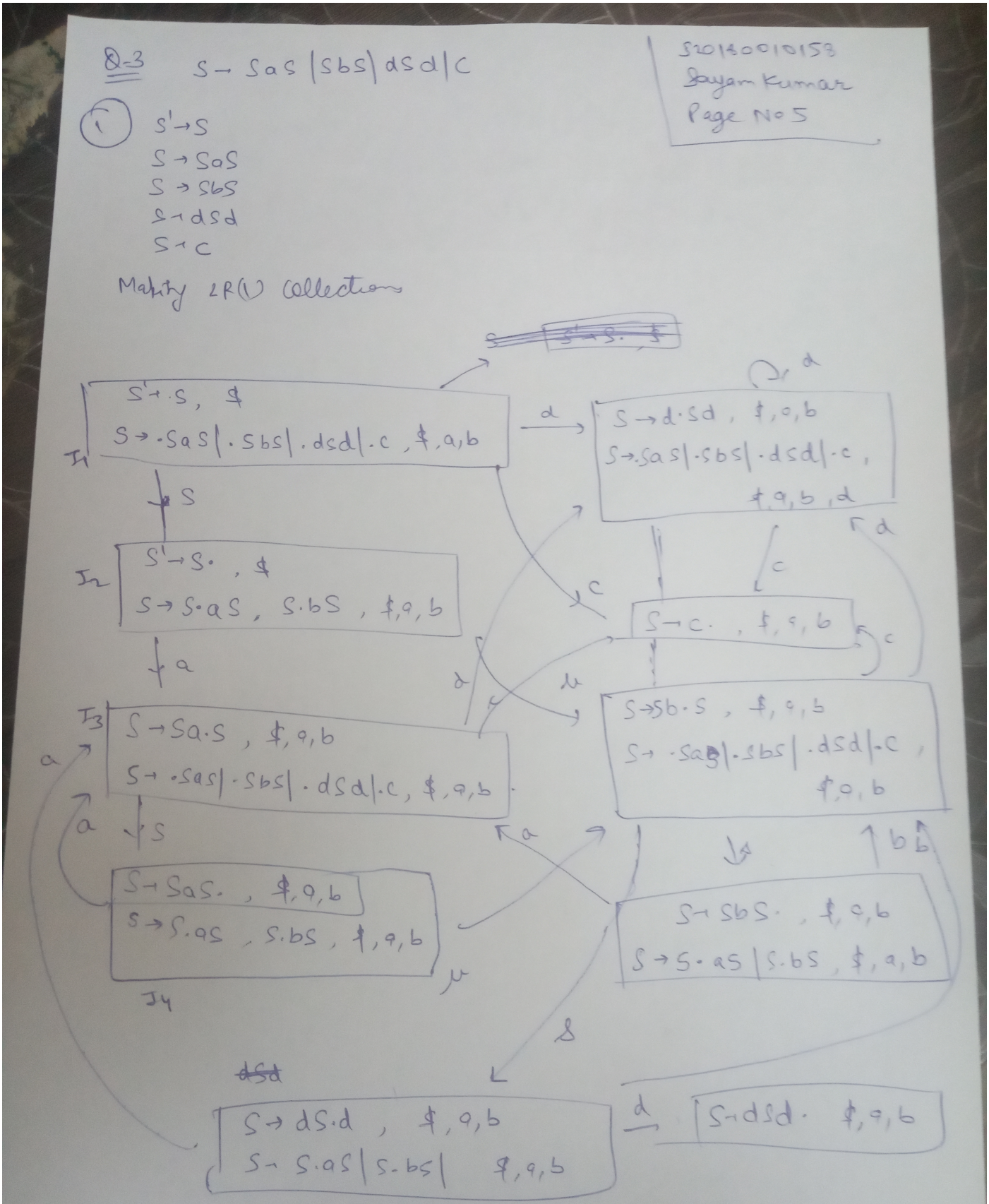
Q-3 $S \to SaS \mid SbS \mid dSd \mid c$

(1) $S' \to S$
$S \to SaS$
$S \to SbS$
$S \to dSd$
$S \to c$

Making LR(1) Collections



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(iii) ~~The CFG is~~

The CFG is not CLR(1) because for I_4, there is a shift reduce conflict