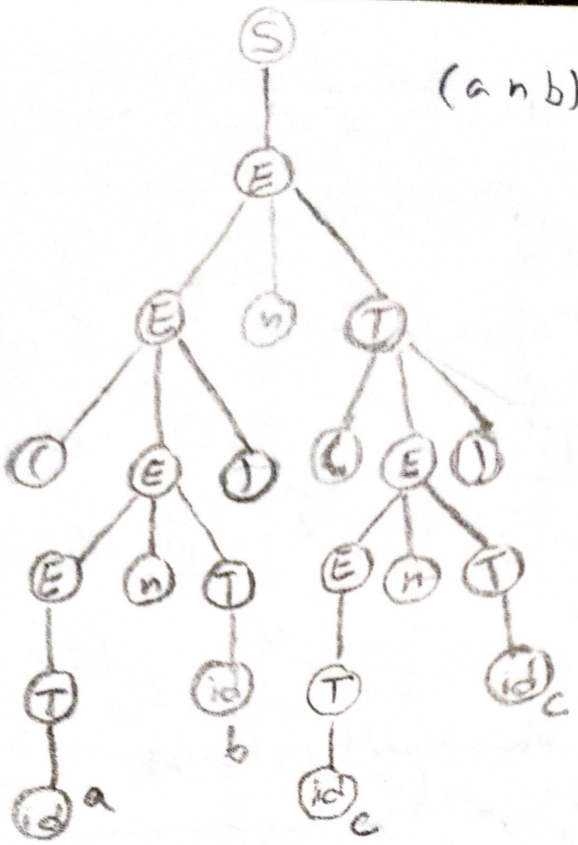
TP4
1a)

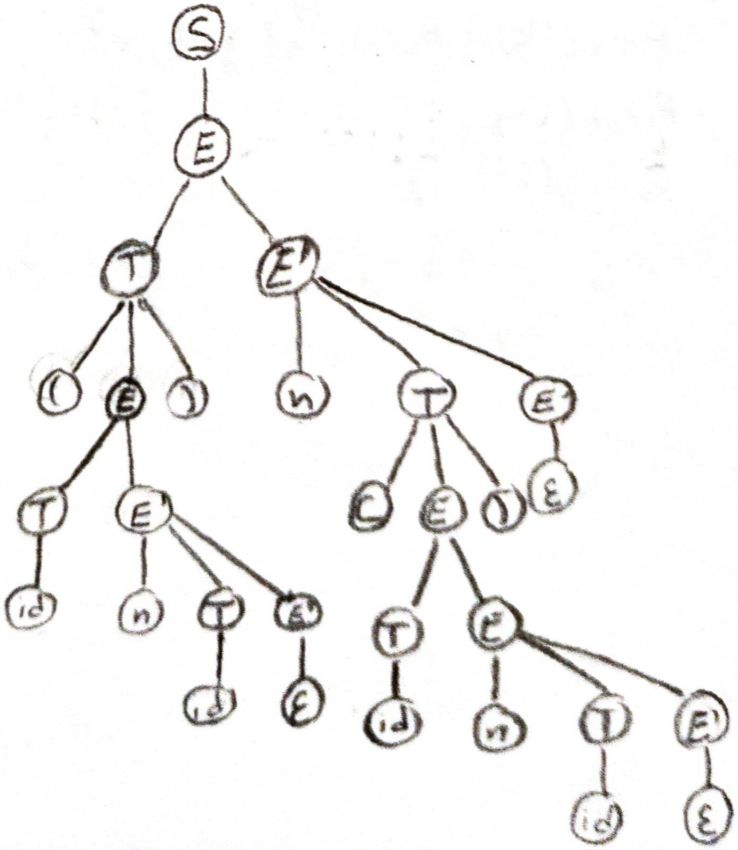
(a n b) n (c n c)



b) Left-recursion em $E \rightarrow E\,n\,T$

c)
$S \rightarrow E\$$
$E \rightarrow TE'$
$E' \rightarrow nTE'$
$\quad | \varepsilon$
$T \rightarrow (E)$
$\quad | \; id$

d)



	id	=	!	$	L	R	St	S
0	s5		s4		g3	g1	2	
1				r2				
2				A				
3		s6		r5				
4	s5		s4		g8	g7		
5		r4		r4				
6	s5		s4		g8	g9		
7		r3		r3				
8		r5		r5				
9				r1				

e) YACC / BISON

0 S → St $ { $$=new(program); $$.add($1)}

1 St → L = R { $$=new(Assign); $$.add($1, $3)}

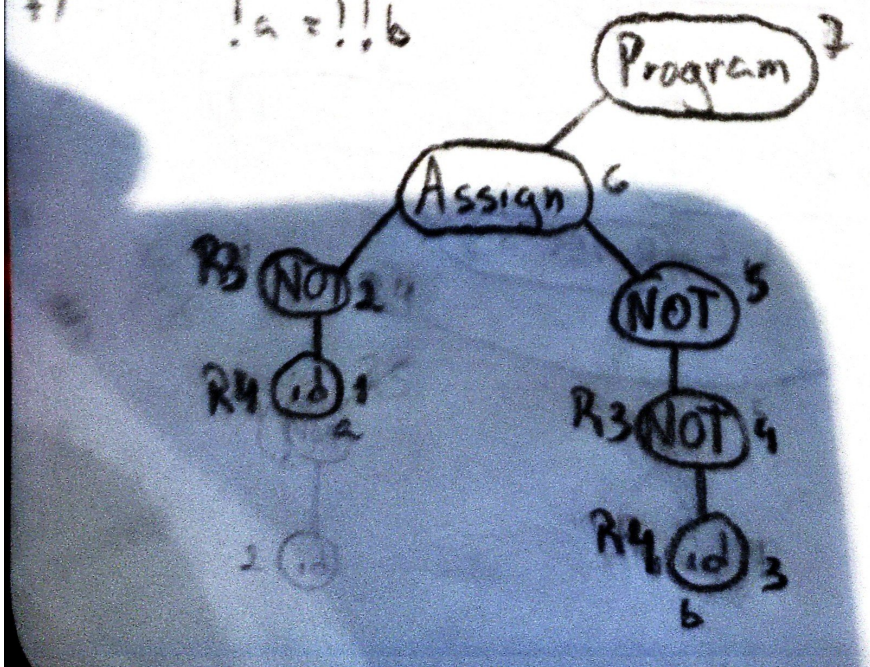
2 St → R { $$ = $1}

3 L → ! R { $$ = new(Not); $$.add ($2)}

4 L → id { $$ = new(id, id.token)

5 R → L { $$ = $1}

f) !a = !!b



$!_4\ a_5$

$!_4\ L_8$

$!_4\ R_7$

$L_3 =_6 !_4\ !_4\ R_3$

$L_3 =_6 !_4\ R_7$

④ 0 $S \to St\,\$$
1 $St \to E\,;$
2 $St \to \{\ StL\ \}$
3 $StL \to StL\ St$
4 $StL \to \varepsilon$
5 $E \to id = E$
6 $E \to id$

First(E) = {id}
First(StL) = First(St) ∪ {ε} = {id, {, ε}
First(St) = First(E) ∪ {{} = {id, {}
Follow(St) = {$}
Follow(StL) = {}} ∪ First(St) = {$, }}
Follow(E) = {;}

Nullable = {StL}

b), c), d) Mesmo de sempre

e)
0 $S \to St\,\$$
1 $St \to E\,;$
2 $St \to \{\ StL\ \}$
3 $StL \to St\ StL$
4 $StL \to \varepsilon$
5 $E \to id\ E'$
6 $E' \to = E$
7 $E' \to \varepsilon$
$\to \varepsilon$

First(E') = {ε, =}
First(E) = {id}
First(St) = {{} ∪ First(E) = {{, id}
First(StL) = {ε} ∪ First(St) = {ε, {, id}
Follow(St) = {$} ∪ First(StL)\{ε} ∪ Follow(StL) = {$, {, id, }}
Follow(StL) = {}}
Follow(E) = {;} ∪ Follow(E') = {;}
Follow(E') = Follow(E) = {;}

	;	=	id	{	}	$
S			0	0		
St			1	2		
StL			3	3	4	
E			5			
E'	7	6				