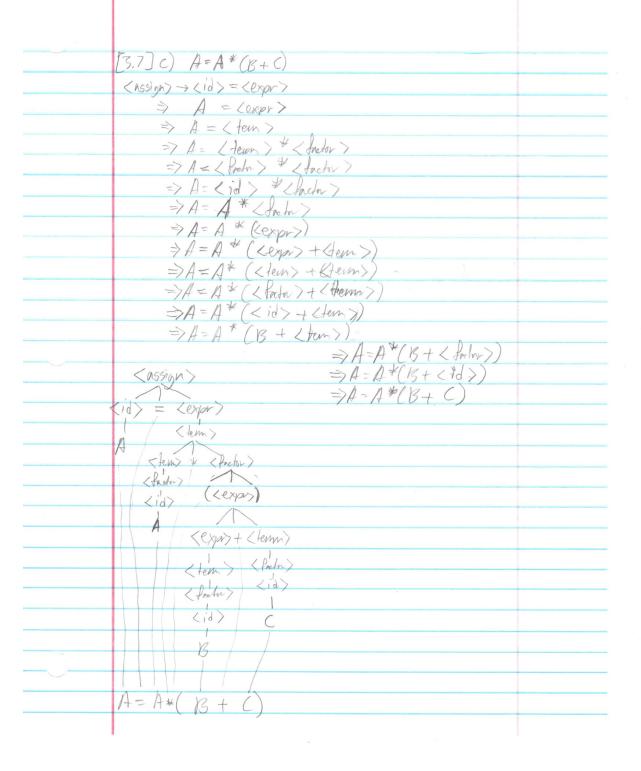
## (1. 20pts) Question 3.7 (page 163) from the textbook. Scanned images:

<pre></pre>	
$\langle id \rangle \rightarrow A   B  C$	
<expr> &gt; <expr> + &lt; tom</expr></expr>	>/< tem>
<fem> -&gt;&lt; tem&gt; * &lt; from&gt;</fem>	1 < fresh > Tole ( )
1 3 7 a) ( co. Francis	John Canoli 5 1 5 th 2414
1. Jayou Lampe	September 5th, 2014
17- 17-10 ) * (	
assign - 10 = (expr)	
- Copr	-
$\Rightarrow A = \langle term \rangle$	
$\Rightarrow A = \langle Pactor \rangle * \langle Form \rangle$	
$\Rightarrow A = (\langle e \times pr \rangle)^* \langle tem \rangle$	
⇒A = ((expr) + (tem)). *< tem>	
$\Rightarrow A = (\langle +em \rangle + \langle +em \rangle) * \langle +em \rangle$	
=> A= ( <factor> + <tem>) * <tem></tem></tem></factor>	
$\Rightarrow A = (\langle id \rangle + \langle tem \rangle) + \langle tem \rangle$	
=> A = (A + < tem>) * < tem>	-
$\Rightarrow A = (A + \langle bactor \rangle) * \langle tem \rangle$	•
$\Rightarrow A = (A + \langle id \rangle) * \langle fem \rangle$	
$\Rightarrow A = (A + B)^{*} \angle \text{fem} > C$	
> A = (A + 15) * < Irolu >	
$\Rightarrow A = (A + B) * \langle id \rangle$	
$\Rightarrow A = (A + B)^{*} C$	
<assign></assign>	-
<id><id><expr></expr></id></id>	
A	
(fodes) + < tem>	
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Cleve Chapter C	
Chalus Zids	
A	

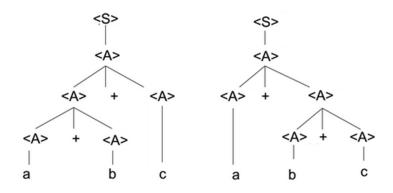
$\begin{array}{l} 3.7 \mid b) A = 18 + C + A \\ & < a \le   c \le  $	(		Donn Canollo
$ \begin{array}{l} \langle assign \rangle \Rightarrow \langle id \rangle = \langle expr \rangle \\ \Rightarrow A = \langle expr \rangle + \langle tem \rangle \\ \Rightarrow A = \langle expr \rangle + \langle tem \rangle + \langle tem \rangle \\ \Rightarrow A = \langle tem \rangle + \langle tem \rangle + \langle tem \rangle \\ \Rightarrow A = \langle fach \rangle + \langle tem \rangle + \langle tem \rangle \\ \Rightarrow A = \langle id \rangle + \langle tem \rangle + \langle tem \rangle \\ \Rightarrow A = \langle id \rangle + \langle tem \rangle + \langle tem \rangle \\ \Rightarrow A = \langle id \rangle + \langle tem \rangle + \langle tem \rangle \\ \Rightarrow A = \langle id \rangle + \langle tem \rangle + \langle tem \rangle \\ \Rightarrow A = \langle id \rangle + \langle tem \rangle + \langle tem \rangle \\ \Rightarrow A = \langle id \rangle + \langle tem \rangle + \langle tem \rangle \\ \Rightarrow A = \langle id \rangle + \langle tem \rangle + \langle tem \rangle \\ \Rightarrow A = \langle id \rangle + \langle tem \rangle + \langle tem \rangle \\ \Rightarrow A = \langle expr \rangle + \langle tem \rangle + \langle tem \rangle + \langle tem \rangle \\ \Rightarrow A = \langle expr \rangle + \langle tem \rangle + \langle tem \rangle + \langle tem \rangle \\ \Rightarrow A = \langle expr \rangle + \langle tem \rangle$		$[3,7]_{b})$ $A = B + C + A$	John Childs
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⇒ A = <expry +="" +<="" <emy="" td=""><td></td><td></td><td></td></expry>			
⇒ A = <expr> + <emy +="" +<="" <emy="" td=""><td></td><td>&gt; A = &lt; expor&gt; + &lt; lem&gt;</td><td></td></emy></expr>		> A = < expor> + < lem>	
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A cerps t clarary $\Rightarrow A = 18 + C + A$ $\langle expr \rangle + \langle en \rangle$ $\langle expr \rangle + $		A=B+C+ <treeny< td=""><td></td></treeny<>	
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Len > Lodo 1  Lactor > Lid > A	1	A (tryps) + (form) => H=15 + (+ H)	
Len > Lodo 1  Lactor > Lid > A		(exam) + Lem) (helm)	
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ZIA) C B		CTACHE / CIO	
		<14>	
		B	
			_



[3,7]d.) A=B*(C*(A+B))
<assign> &gt;cid&gt; = <expr></expr></assign>
$\Rightarrow A = \langle expr \rangle$
=> /4 = 1 tem > < 25510h >
=> A = < fem > * Z Intor > (id) = lexpr>
=> A = (fuelor) * (dotor)
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- n - n + 1 1 - (trus * < them)
=>A-B*( <expr>) <freta> (Lexpr&gt;)</freta></expr>
7H=B"((tem7)
=>A=B*( <tem>) /3 <tem>)</tem></tem>
=> A = B + (Lactur) + Lantur) < terms * Lantur
7A-13 * (Lid) * (tacky) (lexport)
TH=B"(C' (Sheeper ))
=>A=15 *(C*((expr))) Leggri + (tem)
⇒ A= B*(C*((expr)+(tem))) (tem) (fintr)
=> A= B* (C*( <tem>+ <tem>)) &lt; truth&gt;</tem></tem>
=> A=13*(C*(Linetor)+(Liny)) (Linetor) (Liny)
⇒A=B*(C*( <id>&gt;+<tem>)) &lt; id&gt;1  B  B  B  B  B  B  B  B  B  B  B  B  B</tem></id>
71-6 (C (A+ 27em))
=>A=B*(C*(A+ Lfredov>))
 $\Rightarrow A = B + (C + (A + (1)))$
$\Rightarrow A=B^*(C^*(A+B))$

(2. 20pts) Question 3.8 (page 164) from the textbook.

The following two distinct parse trees for the same string prove that the grammar is ambiguous.



(3. 20pts) Question 3.11 (page 164) from the textbook.

$$\langle S \rangle \rightarrow \langle A \rangle$$
 a  $\langle B \rangle$  b

$$\langle A \rangle \rightarrow \langle A \rangle b \mid b$$

Which of the following sentences are in the language generated by this grammar?

- a. baab Yes
- b. bbbab No
- c. bbaaaaa No
- d. bbaab Yes

(4. 10pts) Question 3.13 (page 164) from the textbook.

Write a grammar for the language consisting of strings that have n copies of the letter a followed by the same number of copies of the letter b, where n > 0. For example, the strings ab, aaaabbbb, and aaaaaaabbbbbbbb are in the language but a, abb, ba, and aaabb are not.

Ans: 
$$S \rightarrow a S b \mid a b$$

(5. 20pts) Question 3.23 (page 165) from the textbook.

d) 
$$x = 2 * y + x - 1 \{x > 11\}$$
  
 $2 * y + x - 1 > 11$   
 $2 * y + x > 12$ 

(6. 10pts) Question 3.24(page 165-166) from the textbook.

Now, we have:

Now we have: