

Note: The homework is the same for both sections. It will not be handed in. However, you are *strongly* encouraged to do the homework in order to prepare for the second quiz on **November 6**. The quiz will contain similar problems.

- 1) #2.2
- 2) #2.4 (a,c,d,e)
- 3) #2.5 (d,e)
- 4) #2.6 (a,b)
- 5) #2.9
- 6) #2.15
- 7) #2.18 (a,b)
- 8) #3.1 (a,c)
- 9) #3.2 (b,d)
- 10) #3.8 (b,c)
- 11) Convert the following CFG to Chomsky Normal Form. (The set of variables for the grammar is $V = \{R, S, T, X\}$ and the set of terminals is $\Sigma = \{a, b\}$.)
$$\begin{aligned} R &\rightarrow XRX \mid S \\ S &\rightarrow aTb \mid bTa \\ T &\rightarrow X \\ X &\rightarrow a \mid b \end{aligned}$$
- 12) Draw the state diagram for a PDA recognizing the language

$$L = \{a^i b^j c^k \mid i, j, k \geq 0 \text{ and } i + j < k\}.$$

(Here the input alphabet is $\Sigma = \{a, b, c\}$.)