1. Read Kozen Sections 23, 24, 25.

2. Give a CFG for the set

\[ L = \{a^n b^m \mid n = m \text{ or } 2n = m, \text{ for } n, m \geq 1 \}. \]

3. Give an informal description of a deterministic pushdown automaton accepting the set

\[ A = \{a^m b^n c^n \mid n, m \geq 0 \}. \]

4. Show that the set of CFLs is not closed under intersection. That is, there exist two CFLs whose intersection is not a CFL. Give two such CFLs whose intersection is not a CFL.

5. True or False? If “false”, give a counter-example, and also an example for which the condition is true. If “true”, give a brief, informal justification.

(a) CFLs are closed under complement.
(b) CFLs are closed under intersection with a regular set.

6. Consider the CFG

\[
\begin{align*}
S & \rightarrow AB \mid BC \\
A & \rightarrow BA \mid a \\
B & \rightarrow CC \mid b \\
C & \rightarrow AB \mid a
\end{align*}
\]

Use the CKY algorithm to determine if the following strings are generated:

(a) aaaaaa
(b) aaaaaaa