

**Advanced Sequence Analysis
Summer 2019**

Exercises

Number 7 (31.05.2019), Discussion: 07.06.2019

1. Give a state diagram for the pushdown automaton recognizing the language $\{ww^R \mid w \in \{0,1\}^*\}$. Recall that w^R means w written backwards.
2. Use the construction we studied in class to convert the following context-free grammar to a pushdown automaton:

$$S \rightarrow aS \mid Sb \mid \varepsilon$$

3. Use the construction we studied in class to convert the pushdown automaton we saw as the first example (that one recognizing the language $\{0^n 1^n \mid n \geq 0\}$) to a context-free grammar.
4. Use the pumping lemma to show that the following languages are not context-free:
 - (a) $A = \{a^i b^j c^k \mid 0 \leq i \leq j \leq k\}$.
 - (b) $B = \{ww \mid w \in \{0,1\}^*\}$.