

Automata Theory: Assignment 7

Due date: October 25 (Thursday)

Problem 1 (6 points)

Give a context-free grammar for each of the following languages:

- (a) $\{a^n b^{2n} : n \geq 0\}$
- (b) $\{a^n b^m c^{n+m} : n, m \geq 0\}$
- (c) $\{a^n b^m c^k : n + k \leq m \leq 2n + 2k\}$

Problem 2 (4 points)

Consider the following grammar:

$$\begin{aligned} S &\rightarrow SA \mid A \\ A &\rightarrow aAb \mid \lambda \end{aligned}$$

Show a left-most derivation, right-most derivation, and derivation tree for the string $abaabb$.