

Automata Theory: Assignment 8

Due date: April 4 (Thursday)

Problem 1 (6 points)

Find *simple* grammars for the following languages:

(a) $\{(aa)^nb : n \geq 0\}$

(b) $\{a^nb^n : n \geq 1\}$

Problem 2 (4 points)

Simplify the following grammar; that is, remove all useless variables, λ -productions, and unit-productions.

$$S \rightarrow aSa \mid A \mid aC \mid aD$$

$$A \rightarrow aBa \mid aCa \mid F$$

$$B \rightarrow aBa \mid \lambda$$

$$C \rightarrow aC \mid bD$$

$$D \rightarrow aD \mid bC$$

$$E \rightarrow aD \mid \lambda$$

$$F \rightarrow aa \mid aFa$$