

Automata Theory: Assignment 7

Due date: November 11 (Thursday)

Problem 1 (6 points)

Consider the following grammar:

$$S \rightarrow AB \mid aaB$$

$$A \rightarrow a \mid Aa$$

$$B \rightarrow b$$

- (a) Show that this grammar is ambiguous.
- (b) Give a regular expression that describes the same language.
- (c) Construct an unambiguous grammar that describes the same language.

Problem 2 (4 points)

For each of the following two grammars, construct an equivalent grammar that has no λ -productions and no unit-productions.

(a) $S \rightarrow A \mid B$

$$A \rightarrow a \mid aA$$

$$B \rightarrow b \mid bB$$

(b) $S \rightarrow aAb \mid bAa \mid aSb \mid bSa$

$$A \rightarrow aAa \mid \lambda$$