Automata Theory: Assignment 6

Due date: October 28 (Thursday)

Problem 1 (3 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) $\{a^n b^m : \ 2n \leq m \leq 3n\}$

Problem 2 (3 points)
Consider the following grammar:

$S \to SA \mid A$
$A \to aAb \mid \lambda$

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

Problem 3 (4 points)
Find *simple* grammars (a.k.a. s-grammars) for the following languages:

(a) $\{a^n b : \ n = 0 \text{ or } n \geq 3\}$
(b) $\{a^n b^n : \ n \geq 1\}$