Assignment 10

Automata & Theory of Computation

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1. Produce a context-free language using the grammar G, with productions

$$S \rightarrow aaB,$$
$$A \rightarrow bBb|\lambda,$$
$$B \rightarrow Aa.$$

$S \rightarrow aaAa$

$A \rightarrow bAab|\lambda$

$S \rightarrow aaAa \rightarrow$

$aab^k_A(ab)^k a$

2. Produce a context-free grammar to show the following language is context-free.

$$L = \{ a^n b^m : n \leq m+3, n \geq 0, m \geq 0 \}$$

$n = M$

$S \rightarrow aSb \mid \lambda$

$n \leq m \quad +1 = m+1, \ n = m+2, \ n = m+3$

$S \rightarrow aSb \mid B \mid A$

$B \rightarrow Bb \mid \lambda$

$n = m+1 \rightarrow A \rightarrow a \mid aa \mid aaa$

$\quad\quad\quad$ $S \rightarrow aSb \mid A \mid B$

$\quad\quad\quad$ $A \rightarrow a \mid aa \mid aaa$

$\quad\quad\quad$ $B \rightarrow Bb \mid \lambda$