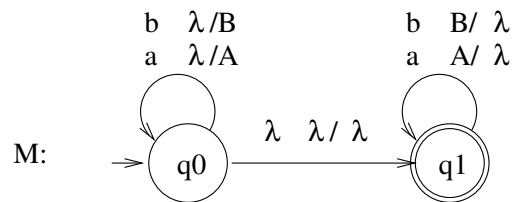# CS3311 Homework 10

The answers must be the original work of the author. While discussion with others is permitted and encouraged, the final work should be done individually. You are not allowed to work in groups. You are allowed to build on the material supplied in the class. Any other source must be specified clearly.

**1.** *(40 points)* Let $M$ be the PDA in Example 7.1.3 on page 226.
$M$ accepts even length palindromes. Show the computation trees for the strings $aabbaa$ and $aba$.

$$
\begin{array}{cc}
\text{b} & \lambda/\text{B} \\
\text{a} & \lambda/\text{A}
\end{array}
\qquad\qquad
\begin{array}{cc}
\text{b} & \text{B}/\lambda \\
\text{a} & \text{A}/\lambda
\end{array}
$$

M: $\rightarrow$ ( q0 ) $\xrightarrow{\ \lambda\ \ \lambda/\lambda\ }$ (( q1 ))

**2.** *(60 points)* Construct PDAs that accept each of the following languages. Explain how the PDA works: write the algorithm it follows, label the specific portions of the machine with the task performed.

    **a.** $\{a^i b^j \mid 0 \le i \le j\}$

    **b.** $\{a^i b^j c^k \mid i, j, k \ge 0 \text{ and } i + k = j\}$