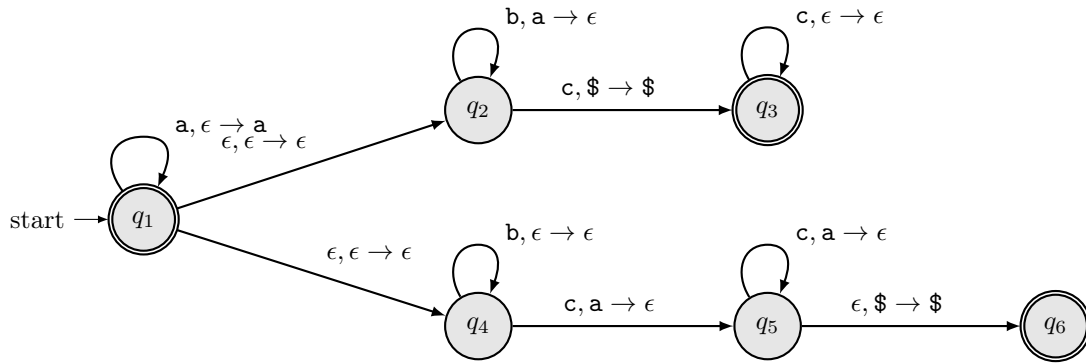
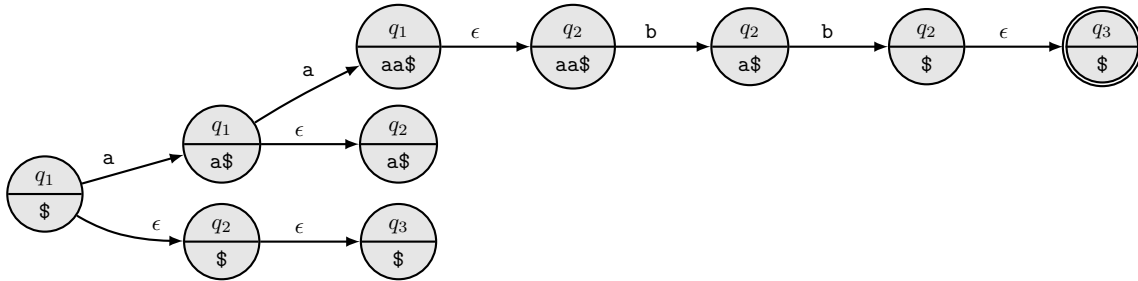


Homework Assignment 5

1. Give a PDA that recognizes $L_1 = \{a^i b^j a^k \mid j = i + k\}$. *Hint:* Try replacing j by $i + k$ in the set builder expression. Do **not** convert a CFG into a PDA.
2. Give a PDA that recognizes $L_2 = \{a^i b^j \mid j = 2i\}$. Do **not** convert a CFG into a PDA.
3. Show that the following PDA rejects string $aaba$; give the answer as the reduction graph we used in class.



4. Derive a PDA from the following reduction graph.



5. Convert the following CFG into a PDA.

$$\begin{aligned}
 S &\rightarrow AB \\
 A &\rightarrow aAb \mid \epsilon \\
 B &\rightarrow bBa \mid \epsilon
 \end{aligned}$$