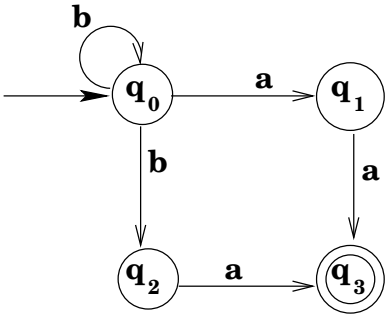
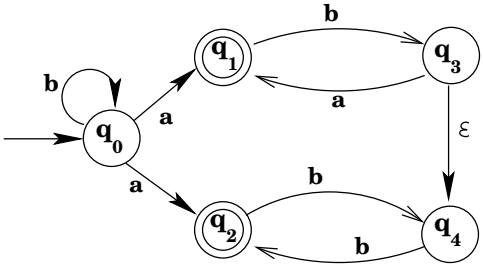
This homework, on the remainder of Chapter 3, is due on Wednesday, November 11.

1. For each of the following NFAs, use the NFA-to-DFA conversion algorithm to find a DFA that accepts the same language as the NFA.

a)



b)



2. For each of the following regular expressions, use the regular-expression-to-NFA conversion algorithm to find an NFA that accepts the language that is generated by the NFA. Do not simply give an NFA that accepts the same language; show the NFA that is constructed by the algorithm.

a) a^*bc^* **b)** $(a|b)^*(aaa|bbb)$ **c)** $(aa|bb)c^*(a|b|c)$

3. Consider the following regular expression over the alphabet $\{a, b, c\}$: $(a|b)c^*a^*$. And let L be the language generated by this regular expression.

a) Use the regular-expression-to-NFA conversion algorithm toa construct an NFA that accepts the same language, L.

b) Use the NFA-to-DFA conversion algorithm to construct a DFA that accepts L.

c) Find a DFA that accepts the *complement* language, $\overline{L}$.

d) Find an NFA or DFA that accepts the *reverse* language, L^R.

4. For each of the following languages, use the Pumping Lemma for Regular Languages to prove that the language is **not** regular.

a) $L_1 = \{a^n b^n c^n \mid n \in \mathbb{N}\}$

b) $L_2 = \{a^n b^m c^k \mid n, m, k \in \mathbb{N} \text{ and } k = n + m\}$

c) $L_3 = \{a^n b^m c^k \mid n, m, k \in \mathbb{N} \text{ and } k > n + m\}$