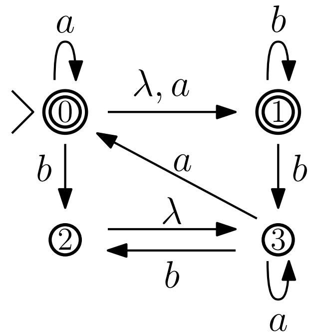
COSC 341 – Tutorial 6

1. Construct an NFA on the alphabet $\{a, b\}$ that accepts the language of all words containing the substring bb. Construct a DFA that is equivalent to M.

2. Let M be following NFA on the alphabet $\{a, b\}$:



   Give the λ-closure for each state. Construct a DFA that is equivalent to M.

3. Build an NFA on the alphabet $\{a, b\}$ that accepts the language $L_1 = \{a, aba, ababa, abababa, \dots\}$ and one that accepts the language L_2 of all words that do not contain b's. Use λ-transitions to combine them into an NFA accepting L_1 and L_2. Convert that NFA to an equivalent DFA.

4. Use the *pumping lemma* to show that the language $L = \{a^n b^{n+1} \mid n \geq 0\}$ is not an automatic language.

Homework

1. Build an NFA on the alphabet $\{a, b\}$ that accepts the language $L_1 = \{ab, abab, ababab, abababab, \dots\}$ and one that accepts the language $L_2 = \{ba, baba, bababa, babababa, \dots\}$. Use λ-transitions to combine them into an NFA accepting L_1 and L_2. Convert that NFA to an equivalent DFA.

2. Use the pumping lemma to show that none of the following languages are automatic languages:

   (a) $L = \{a^n b^{2n} \mid n \geq 0\}$.

   (b) $L = \{a^n b^m \mid n \leq m\}$.