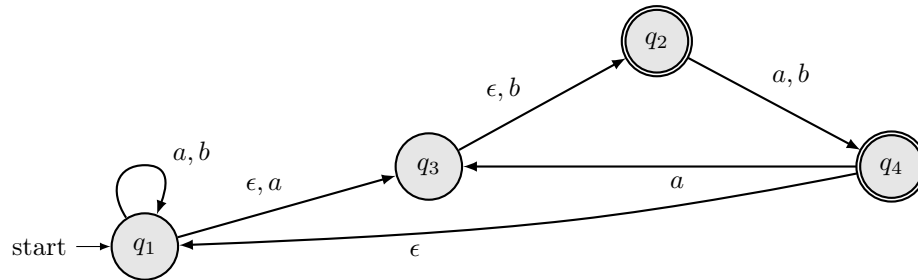


Homework Assignment 3

1. Convert the regular expression $(a^* + \epsilon) \cdot b^*$ into an NFA using the method from class. Present the answer as a state diagram.
2. Convert the following NFA into a regular expression using the method from class. Write the conversion step-by-step, enunciating which state you are compressing at each step.



3. Problem 1.31.
4. Convert the NFA in Exercise 2 into an equivalent NFA without epsilon transitions.
5. Which of the following languages is regular? If the language is regular, then give a DFA, NFA, or regular expression. If the language is not regular, prove it using the Pumping Lemma.
 - (a) $L_1 = \{0^n 1^m \mid m \geq 0 \wedge n \geq 0 \wedge n < m\}$
 - (b) $L_2 = \{w \mid w \in \{a, b\}^* \wedge w \text{ has twice as many } a\text{'s as } b\text{'s}\}$