

CSC236 Week 12 Tutorial:

# DFAs, NFAs

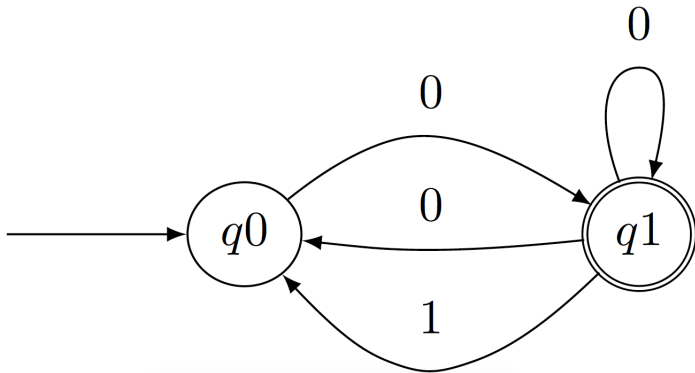
## Preliminary

For the following language, give an NFA with no  $\epsilon$ -transitions that matches the language. Give informal justification for why your NFA is correct.

$$L = \{w \in \{0, 1\}^* \mid w \text{ starts with } 01 \text{ but does not end with } 01\}$$

## Exercise 1

Use the subset construction algorithm from lecture to produce an equivalent DFA from the following NFA. Please show your work so that we know how each state is generated.



## Exercise 2

Consider the language  $M = \{w \in \{0,1\}^* \mid \text{the third symbol from the right of } w \text{ is } 1\}$ .

Prove that any NFA with no  $\epsilon$ -transitions that accepts this language must have at least 3 states.

*Hint:* The proof technique for DFA does not work for NFA. So you need to do something clever. Recall from lecture that the DFA recognizing this languages needs at least 8 states. Then think about “subset construction”.