COMS 3261 Review Handout 3B
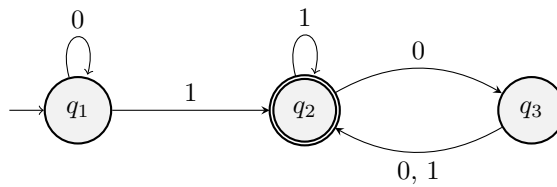# Practice Questions: Finite Automata

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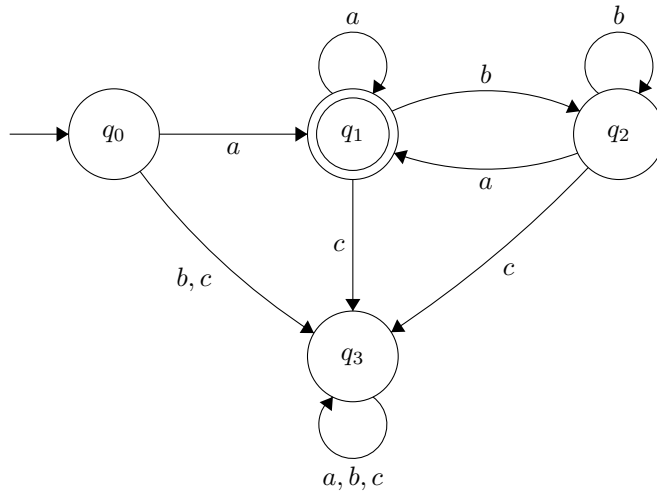
Fall 2022

1 DFA Exercises

1. Determine which of ε, 11, 010, 10, 0101 is accepted by this DFA.

2. The DFA state diagram below is defined on the alphabet $\Sigma = \{a, b, c\}$. Write out its formal definition (as a 5-tuple). When specifying the transition function δ, draw a table.

3. Draw a DFA that recognizes:

   (a) All strings with the prefix 01.

   Bonus Question: Draw a computation tree on string 1101.

   (b) $L = \{11, 101, 010, 0110\}$.

   (c) $L = \{w \in \{0,1\}^* \mid$ the number of 1's in w is not an integer multiple of 5$\}$.

2   NFA Exercises

1. Draw an NFA that recognizes:

   (a) All strings that contain 101.

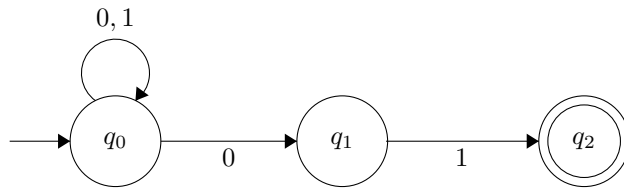   (b) $L = \{w \in \{0,1\}^* \mid w$ has exactly two 0's or an even number of 1's$\}$.

3   Miscellaneous Exercises

1. Prove the following languages are regular:

   (a) $L = \{0^m 1^n \mid m, n \geq 0, \text{ and } m + n \text{ is odd}\}$

   (b) $L = \{x \in \{0, 1\}^* \mid x \text{ contains a substring of two 1's separated by an odd number of characters}\}$

2. Convert this NFA to a DFA using subset construction:

3. (a) What is the language recognized by this NFA?

(b) What is the language recognized by this NFA?