

CSE 390z: Mathematics for Computation Workshop

QuickCheck: DFAs and NFAs Solutions (due Monday, March 10)

Please submit a response to the following questions on Gradescope. We do not grade on accuracy, so please submit your best attempt. You may either typeset your responses or hand-write them. Note that hand-written solutions must be legible to be graded.

We have created [this template](#) if you choose to typeset with Latex. [This guide](#) has specific information about scanning and uploading pdf files to Gradescope.

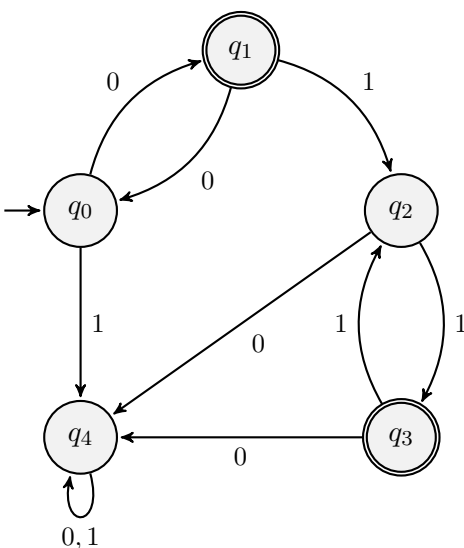
0. Constructing DFAs and NFAs

- (a) Let $\Sigma = \{0, 1\}$ and L be the language over Σ such that $w \in L$ iff. w contains an even number of 1s and odd number of 0's and does not contain the substring 10.

Give a DFA to accept strings in L .

Solution:

Note that a binary string not containing 10 as a substring must be of the form 0^*1^* . The additional constraints mean we are looking for numbers of the form 0^x1^y with x odd and y even.



q_4 : strings that are not of the form 0^*1^* or are of the form 0^x11^* with x even

q_3 : strings of the form 0^x1^y with x odd and y even

q_2 : strings of the form 0^x1^y with x and y odd

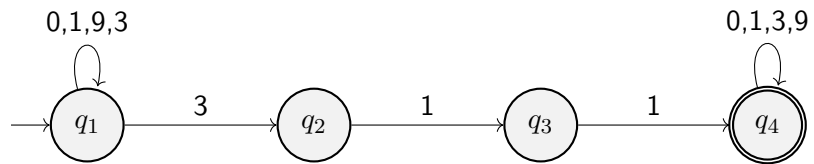
q_1 : strings of the form 0^x with x odd

q_0 : strings of the form 0^x with x even

(b) Let $\Sigma = \{0, 1, 3, 9\}$ and L be the language over Σ such that $w \in L$ iff. The string "311" is a substring of w .

Give an NFA to accept strings in L .

Solution:



1. Video Solution

Watch **this** solution video **after** making an initial attempt. Then, answer the following questions.

- (a) What is one thing you took away from the video solution?
- (b) What topic from the quick check or lecture would you most like to review in workshop?
- (c) **Optional:** How did you like the Imposter Syndrome Workshop? Any feedback for future quarters?