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February 6, 2023

Comp 4200

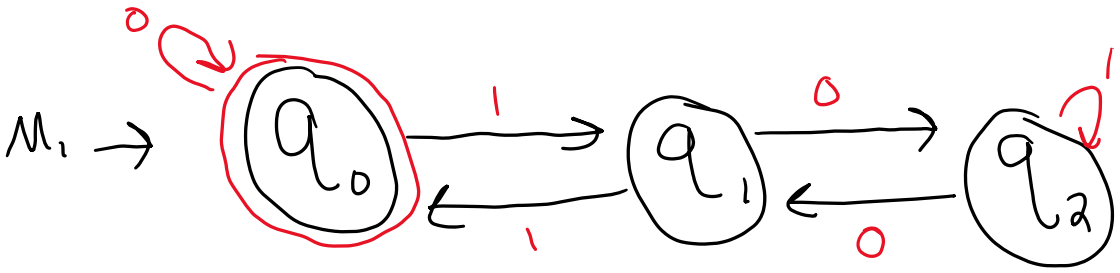
Assignment 2

Problem 1

Total: 30 points (10 points each)

Draw the state diagram of DFAs recognizing the following languages.

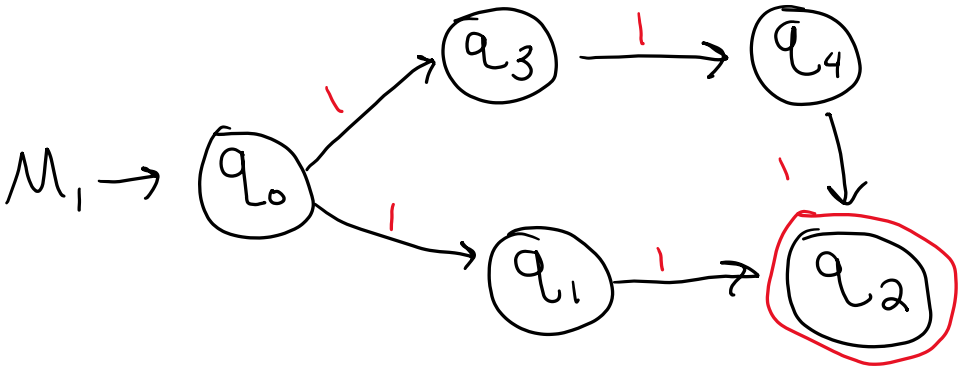
1. A = { w | length of w, |w|, is a multiple of 3 }



Problem 1

Total: 30 points (10 points each)
Draw the state diagram of DFAs recognizing the following languages.

2. B = {11, 111}

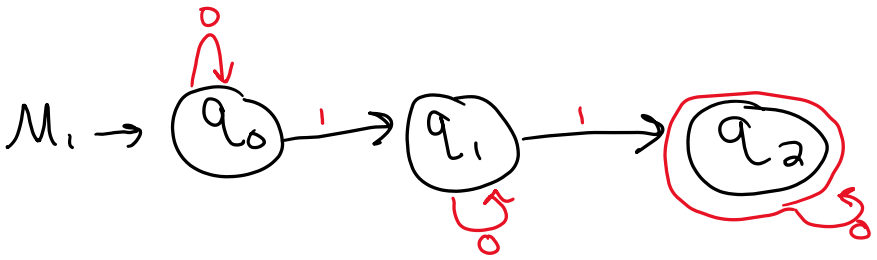


Problem 1

Total: 30 points (10 points each)

Draw the state diagram of DFAs recognizing the following languages.

3. C = { w | w contains an even number of 0's and contains exactly two 1's }



Problem 2

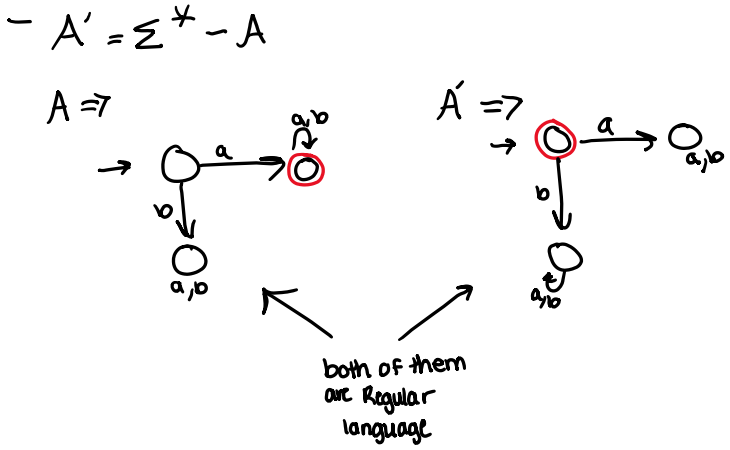
Total: 30 points
Example of set difference: $A = \{0, 01\}$, and $B = \{0, 11\}$. Then, $A - B = \{01\}$.

Prove that regular languages are closed under the set *difference* operation. That is, if A and B are regular languages, then $A - B$ is also a regular language.

Hint: One can prove the statement above by either (1) contradiction or (2) construction. For the proof, you may make use of the theorems that regular languages are closed under *union*, *intersection*, and *complement*.

- To prove that regular languages are closed under the set difference operation by contradiction, we must start by stating the theorems,

1. We know that regular languages are closed under union.
2. Regular languages are closed under complementation:



3. Regular languages are closed under intersection.