

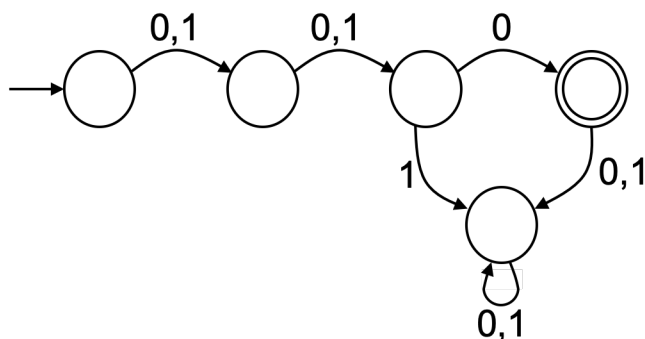
# CSCI 338

## Homework 1 Solutions

Assigned 8/30/2022, due by start of class (3:05 pm) on 9/6/2022. Please submit this assignment to the appropriate dropbox on D2L. You must follow the collaboration policy detailed on the course website.

**Problem 1 (5 points).** Assuming the alphabet is  $\{0, 1\}$ , build a DFA that recognizes the following language:  $\{w : |w| = 3 \text{ and the third symbol is a } 0\}$ . Note:  $|w|$  denotes the length of string  $w$  (i.e. the number of characters in it). For example, when  $w = 1101$ ,  $|w| = 4$ .

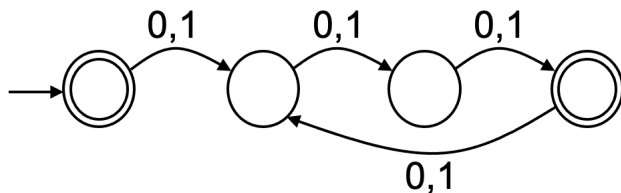
*Solution.* DFA:



□

**Problem 2 (5 points).** Assuming the alphabet is  $\{0, 1\}$ , build a DFA that recognizes the following language:  $\{w : |w| \text{ is divisible by } 3\}$ .

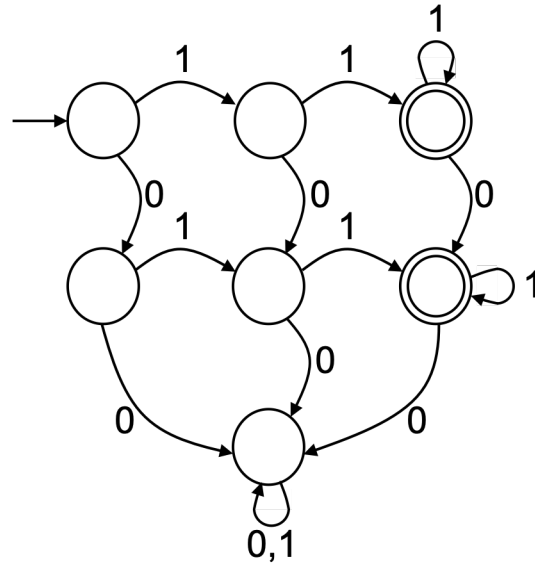
*Solution.* DFA:



□

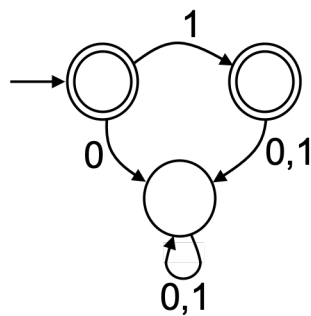
**Problem 3 (5 points).** Assuming the alphabet is  $\{0, 1\}$ , build a DFA that recognizes the following language:  $\{w : w \text{ contains at least two 1s and at most one 0}\}$ .

*Solution.* DFA:



□

**Problem 4 (5 points).** Succinctly describe the language of the following DFA:



*Solution.* The DFA accepts strings of the form:  $\{w : w = \epsilon \text{ or } 1\}$

□