

CSCI 338

Homework 2

Assigned 9/6/2022, due by start of class (3:05 pm) on 9/13/2022. 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 $\{0, 1\}$, prove that the following language is regular: $\{w : w \text{ ends with an odd number of 1's}\}$. For example, $w = 10010111$ should be accepted, since it ends with three 1's, $w = 1101011$ should be rejected since it ends with two 1's, $w = 110100$ should be rejected since it ends with zero (even number) 1's.

Problem 2 (5 points). Assuming the alphabet is $\{0, 1\}$, prove that the following language is regular: $\{w : w \text{ does not end with a 0}\}$

Problem 3 (5 points). Assuming the alphabet is $\{0, 1\}$, build an NFA that recognizes the following language:

$\{w : w \text{ ends with an even number of 0's or } w \text{ does not start with a 1}\}.$

Problem 4 (5 points). Assuming the alphabet is $\{0, 1\}$, build an NFA that recognizes the following language:

$\{w = uv : u \text{ ends with an even number of 0's and } v \text{ does not start with a 1}\}.$ In plain english, if the string *can* be segmented into two parts (u and v) such that the first part ends with an even number of 0's and the second part does not start with a 1, then that string should be accepted.