

# CS 3530: Assignment 1f

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## Exercise 1.29b (10 points)

### Problem

Use the pumping lemma to show that the following languages are not regular.

**b.**  $A_2 = \{www : w \in \{a, b\}^*\}$

### Solution

$S = \text{abbabbabb}$   $x = a$ ,  $y = \text{bb}$ ,  $z = \text{abbabb}$

if  $i = 2$ :  $xy^iz = (a)(\text{bbbb})(\text{abbabb}) = \text{abbbbabbabb}$  which is not a part of the regular language.

## Problem 1.46c (10 points)

### Problem

Prove that the following languages are not regular. You may use the pumping lemma and the closure of the class of regular languages under union, intersection, and complement.

**c.**  $\{w : w \in \{0, 1\}^* \text{ is not a palindrome}\}^1$

### Solution

$S = 0100$

$x = \text{empty}$   $y = 0$   $z = 100$

$i = 2$ :  $xy^iz = 00100$  which is not a part of the language.

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<sup>1</sup>A *palindrome* is a string that reads the same forward and backward.