

CS 3530: Assignment 1f

Fall 2023

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

when $i = 2$:

$aaabaabaab$ is a contradiction, so A_2 is not a 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

$$q = P - K$$

$$xy^0z = 0^q(0^k)^010^P$$

$$= 0^q10^P$$

xy^0z is not the same forward and backward because $P - K < P$

¹A *palindrome* is a string that reads the same forward and backward.