

CS 3530: Assignment 2f

Fall 2023

Problem 2.30ab (20 points)

Problem

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

- a. $\{0^n 1^n 0^n 1^n | n \geq 0\}$

Solution

$$s = 0^P 1^P 0^P 1^P$$

if v and y only contain one type of symbol uv^2xy^2z will be produce sections of 1 and 0 runs of differing length.

if v and y contain more than one type of symbol uv^2xy^2z will produce symbols in the wrong order.

- b. $\{0^n \# 0^{2n} \# 0^{3n} | n \geq 0\}$

Solution

$$s = 0^P \# 0^{2P} \# 0^{3P}$$

if v or y contain a #, uv^2xy^2z will contain more than 2 #'s

uv^2xy^2z does not maintain the correct ratio for lengths of the segments