

CMPE 350 - Spring 2017

PS 7 - 28.03.17

- Assume that we modify the PDA model so that the stack now has only a finite capacity. Can this new type of machine recognize any infinite context-free language? Is the set of languages recognized by this new type of machine equal to the set of regular languages?

- Show that context-free languages are **not** closed under complementation and intersection.

2.18 b) Use part a) to show that the language $A = \{w | w \in \{a, b, c\}^* \text{ and contains equal number of } a\text{'s, } b\text{'s and } c\text{'s}\}$ is not a CFL.

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

a) $\{0^n 1^n 0^n 1^n | n \geq 0\}$

d) $\{t_1 \# t_2 \# \dots \# t_k | k \geq 2, \text{ each } t_i \in \{a, b\}^*, \text{ and } t_i = t_j \text{ for some } i \neq j\}$

2.31 Let B be the language of all palindromes over $0, 1$ containing an equal number of 0's and 1's. Show that B is not context-free.

2.47 Let $\Sigma = \{0, 1\}$ and let B be the collection of strings that contain at least one 1 in their second half. In other words, $B = \{uv | u \in \Sigma^*, v \in \Sigma^* 1 \Sigma^* \text{ and } |u| \geq |v|\}$.

a) Give a PDA that recognizes B .

b) Give a CFG that generates B .