CMPE 350 - Spring 2016

PS 7 - 30.03.16

• 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 a) Let C be a context-free language and R be a regular language. Prove that the language $C \cap R$ is context-free.

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

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.