CMPE 350 - Spring 2018

PS 8 - 02.04.18

2.39 Refer to Problem 1.42 for the definition of the shuffle operation. Show that the class of context-free languages is not closed under shuffle.

2.40 Say that a language is prefix-closed if all prefixes of every string in the language are also in the language. Let C be an infinite, prefix-closed, context-free language. Show that C contains an infinite regular subset.

• For some $n \geq 1$, does there exist an n-state PDA which accepts finitely many strings, and at least one of those strings is of length n?

• Let G be a grammar in Chomsky Normal Form with k variables. Prove or disprove the following statement: "If G generates a string of length $2k$, then L(G) is always infinite"

• Design a context-free grammar whose language contains a string which has infitely many derivations.

• Prove that a PDA that has the ability to reverse the contents of its stack is more powerful than the ordinary PDA.