CMPE 350 - Spring 2019

PS 3 - 04.03.19

• Prove: "If a DFA with n states accepts a string of length $n-1$, then it also accepts infinitely many other strings."

1.29 Use the pumping lemma to show that the following languages are not regular.

b) $A_2 = \{www | w \in \{a,b\}^*\}$

c) $A_3 = \{a^{2^n} | n \geq 0\}$

• Show that $L = \{010^n1^n | n \geq 0\}$ is not regular.

1.46 Prove that the following languages are not regular. You may use the pumping lemma and the closure properties of the class of regular languages under union, intersection and complement.

a) $L = \{0^n1^m0^n | m, n \geq 0\}$

b) $L = \{0^m1^n | m \neq n\}$

c) $L = \{w | w \in \{0,1\}^* \text{ is not a palindrome}\}$

1.54 Consider the language $F = \{a^ib^jc^k | i, j, k \geq 0 \text{ and if } i = 1, \text{ then } j = k\}$

a) Show that F is not regular.

1.38 An all-NFA M is a 5-tuple $(Q, \Sigma, \delta, q_0, F)$ that accepts $x \in \Sigma^*$ if every possible state that M could be in after reading input x is a state from F. Note, in contrast, that an ordinary NFA accepts a string if some state among these possible states is an accept state. Prove that all-NFAs recognize the class of regular languages.

• Some questions from old exams