CMPE 350 - Spring 2018

PS 4 - 05.03.18

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.

b) $L = \{0^m 1^n | m \neq n\}$

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

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.

- TRUE or FALSE

1. If $L_1 \cup L_2$ is regular and L_1 is regular, then L_2 is regular.
2. If L_1 is regular and $L_2 \subseteq L_1$, then L_2 is regular.
3. If L_1 is regular and L_2 is not regular, then $L_1 \cup L_2$ is not regular.
4. If L_1 is regular and $L_1 \cup L_2$ is not regular, then L_2 is not regular.
5. If L_1 is regular and L_2 is not regular, then $L_1 \cap L_2$ is not regular.
6. If L_1 is not regular and L_2 is not regular, then $L_1 \cup L_2$ is not regular.

- Some questions from old exams