CS 311 Homework 6

November 4, 2013

1. (from 2.31 in Sipser) Let B be the language of all palindromes over $\{0,1\}$ that have equal numbers of 0s and 1s. Prove that B is not context-free.

2. (from 2.25 in Sipser) For any language A, let SUFFIX$(A) = \{v | uv \in A$ for some string $u\}$. Show that the class of context-free languages is closed under this operation.

3. (from 2.30 in Sipser) Use the pumping lemma to show that the following languages are not context free

   (a) $\{0^n1^n0^n1^n | n \geq 0\}$

   (b) $\{w\#t | w$ is a substring of $t, w, t \in \{a,b\}^*\}$

4. (from 2.20 in Sipser) Let $A/B = \{w | wx \in A$ for some $x \in B\}$. Show that if A is context free and B is regular that A/B is context free. Look at 2.18 in Sipser and its solution in the book as a starter. Also, as a matter of intution for A/B consider the fact that $A/\epsilon = A$, $A/\emptyset = \emptyset$, and A/Σ^* is the set of all prefixes of strings in A.