

CS 321: Assignment 5

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November 4, 2016

1. (a)
 - i. Adversary picks p
 - ii. I pick: $w = a^p b^{p+1}$
 - iii. Adversary splits w into $w = xyz$
 - $xy = a^p$
 - $z = b^{p+1}$
 - $|xy| \leq p$
 - $|z| = p + 1 > 0$
 - iv. I choose $i = 2$
then, $xy^i z = xy y z$ has $p + |y|$ a's and $p+1$ b's.
 $p + |y| > p + 1$. Therefore there are more a's than b's which means that $\text{num}(aa, w) \neq \text{num}(bbb, w)$. Thus, this string is not in the language.
- (b) World
2. (a) All strings where $\overline{W} = \text{rev}(W)$ follow format:
SubStr.ReversedSubStr
CFG:
 $S \rightarrow 0S1|1S0|\epsilon$
(b) **Answer:** $S \rightarrow aSb|bSa|SS|\epsilon$
3. $\{w \in \{a, b\}^* | \text{num}(aaa, w) = \text{num}(bb, w)\}$
Python pseudo-code description

