CSCI 340 — Homework 7

Professor Killian

Due: March 17, 2019 @ 11:59PM

1. Show the following CFG generates the language defined by the RE $\mathbf{a}^*\mathbf{bb}$

   $S \to aS \mid bb$

2. Show the following CFG generates the language of all strings with a triple b (HINT: What's the regular expression?)

   $S \to XYX$

   $X \to aX \mid bX \mid \Lambda$

   $Y \to bbb$

3. Find a CFG for each of the following:

   (a) All words in which the letter b is never tripled

   (b) All words that have different first and last letters

   (c) All words that don't have the substring ab

4. Describe the language generated by the following CFG:

   $S \to SS$

   $S \to XXX$

   $X \to aX \mid Xa \mid b$

5. Write a CFG to generate the language MOREA. By definition MOREA contains all strings that have more a's than b's

6. Show the following CFGs are ambiguous

   (a) $S \to XaX$
   $X \to aX \mid bX \mid \Lambda$

   (b) $S \to aSX \mid \Lambda$
   $X \to aX \mid a$

7. For the CFGs in Problem 5, provide a non-ambiguous CFG