CS5104 Assignment 4
Due: Wednesday, April 7

1. Consider the CFG

   S => aX
   X => aX|bX|ε

   What is the language this CFG generates?

2. Consider the CFG

   S => XaXaX
   X => aX|bX|ε

   What is the language this CFG generates?

3. Find a CFG for each of the languages defined by the following regular expressions:

   a. ab*
   b. a*b*
   c. (baa + abb)*

4. Write a CFG to generate the language MOREA of all strings that have more a’s than b’s.

5. Show that the following CFGs are ambiguous by finding a word with two distinct parse trees.

   i. S => SaSaS|b
   ii. S => aSa|Sa|a

6. Build a PDA for the language \{a^mb^n | n \neq 0 \text{ and } m \neq 0\}

7. Build a PDA for the language \{a^{2n}b^n | n \neq 0\}

8. Build a PDA for the language \{a^lb^mc^n | l, m, n \geq 0 \text{ and } l + m = n\}