CS-581: Theory of Computation
HW #2

Due Date: Feb. 1, 2016. Bring hardcopy to class.

From the textbook (page 154 in 3ed of textbook):

    2.6 (b)
        (d)
    2.7 (b)
        (d)
    2.9
    2.13 (a)
         (b)
    2.15
    2.19
    2.28 (a)
         (b)
         (c)
    2.30 (a)
         (d)
    2.31
    2.33
    2.35
    2.46

Some of these problems may be very hard. Do what you are able to do.

All problems are the same in the second edition except problem 2.46, which is not present. It is this:

2.46 Consider the following CFG G:

$$S \rightarrow SS \mid T$$
$$T \rightarrow aTb \mid ab$$

Describe L(G) and show that G is ambiguous. Give an unambiguous grammar H where L(H) = L(G) and sketch a proof that H is unambiguous.

For the International Edition (3rd edition), some questions have different numbers.

2.19 → 2.31
2.28 → Not in the international edition; see below.

2.30 → 2.42
2.31 → 2.43
2.35 → 2.47
2.46 → 2.18

Question 2.28: Give unambiguous CFGs for the following languages.

   a. { w | in every prefix of w the number of **a**'s is at least the number of **b**'s }
   b. { w | the number of **a**'s and the number of **b**'s in w are equal }
   c. { w | the number of **a**'s is at least the number of **b**'s in w }