CSE 322 Winter 2007
Assignment #6

Due: Friday, February 23, 2007

Reading assignment: Read Section 2.2 of Sipser's book and the handout on the Cocke-Kasami-Younger algorithm.

Problems:

1. Apply the Cocke-Kasami-Younger algorithm to the following Chomsky Normal Form grammar to show that string $babbaa$ is accepted (show the tableau):

$$
\begin{aligned}
S &\rightarrow AB \mid BA \mid AT \mid BU \mid SS \\
T &\rightarrow SB \mid SU \\
U &\rightarrow SA \\
A &\rightarrow a \\
B &\rightarrow b
\end{aligned}
$$

2. Sipser's text, 2nd edition Exercise 2.5 (b), (c), (d), (e) (1st edition Exercise 2.5 (b), (c), (d), (f)). Your informal descriptions should document your diagrams.

3. For any language A, let $PREFIX(A) = \{x \mid xy \in A \text{ for some string y}\}$. Show that the class of context-free languages is closed under the $PREFIX$ operation.

4. Carry out the general top-down construction to convert a CFG to a PDA (the one done both in class and in the text) for the following grammar:

$$ S \rightarrow (S) \mid [S] \mid SS \mid \epsilon $$

   Now, do the same for the bottom-up construction given in class.
   Finally, for each of the PDA's show a sequence of configurations that would cause the PDA to accept the input $[[()[]]]()$.

5. (Extra credit) Sipser's text, 2nd edition Problem 2.22 (1st edition Problem 2.26).