

## CS 405/505 ASSIGNMENT #1

Due Monday, August 22, 2005, 5:45 P. M.

### Fill in the Blank.

1. Name: \_\_\_\_\_
2. I have satisfied the prerequisites of CS 303 Algorithms and Data Structures and CS 350 Formal Languages and Automata, or equivalent, each with a grade of C or better.

Signature: \_\_\_\_\_

### True or False.

For each of the problems below, indicate whether it is true or false. Justify your answer in either case.

3. A context-free grammar defining a deterministic context-free language may always be converted into a deterministic pushdown automaton.
4. The context-free grammar below is ambiguous.  
 $S \rightarrow \text{if (e) } S \mid \text{if (e) } S \text{ else } S \mid s$
5. It is not possible to implement a tree data structure where interior nodes have an arbitrary number of children (e.g. some nodes may have 1 child, some 2, some 3, etc.).

### Short Answer.

6. Assume a binary tree object with functions `value`, `left` and `right` to return the value of the current node, left subtree, and right subtree, respectively. Using an actual programming language or pseudo-code, write a function `postorder` to print the values of all nodes in the tree using a post-order traversal. Please write your answer on back.