

CS 4810 Homework Assignment 10 due in class Nov. 5

Your homework will be graded on the neatness of your write up as well as its correctness.

1. Is the string *abbab* derivable from the grammar

$$S \rightarrow AB|BC$$

$$A \rightarrow BA|a$$

$$B \rightarrow CC|b$$

$$C \rightarrow AB|a$$

Is there more than one derivation of the string? Give a convincing argument that your answer for whether there is more than one derivation is correct. One sentence should be sufficient.

2. Explain why the class of context-free languages is closed under init.

$$\text{Init}(L) = \{x|\exists y, xy \in L\}$$

3. Prove that the class of context-free languages is not closed under half.

$$\text{half}(L) = \{x|\exists y, |x| = |y|, xy \in L\}$$

4. and 5. Explain how one can simulate a multi state pda with a single state pda. Give enough details to convince us that you understand how to do this. Grade will depend on quality of your answer.