CS 5000: Theory of Computability
Assignment 6
Chomsky Normal Form

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October 7, 2017

1 Learning Objectives

1. Context-Free Grammars
2. Chomsky Normal Form

Problem 1 (2 points)

Convert this grammar into Chomsky Normal Form:

1. $S \rightarrow ABa$
2. $A \rightarrow aab$
3. $B \rightarrow Ac$

Problem 2 (2 points)

Convert this grammar into Chomsky Normal Form:

1. $S \rightarrow ABC$
2. $C \rightarrow BaB|c$
3. $B \rightarrow b|bb$
4. $A \rightarrow a$

Problem 3 (1 point)

Let $G = (V, T, S, P)$ be a CFG grammar without any ϵ-productions or unit productions. A unit production is a production of the form $A \rightarrow B$, where $A, B \in V$. Let k be the maximum number of symbols on the right of any production in P. Sketch a proof that there is an equivalent CNF grammar with no more than $(k-1)|P| + |T|$ productions.

What to Submit?

Submit your solutions via Canvas.