Formal Languages and Automata Theory
Homework 8 (CFL-3), Due date 12.12.2017

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Consider the following grammars:

- $G_1 = \langle \{S, A, B\}, \{0, 1\}, \{S \to AB1 \,|\, 0, A \to 00A \,|\, B, B \to 1A1 \,|\epsilon\}, S\rangle$
- $G_2 = \langle \{E, T, F\}, \{(,), +, *, a\}, \{E \to E + E \,|\, T, T \to T * F \,|F, F \to (E) \,|a\}, E\rangle$

Exercise 1 *(8 points) Convert both grammars to Chomsky Normal Form. Show all conversion steps.*

Exercise 2 *(8 points) Convert both grammars to Greibach Normal Form. Show all conversion steps.*

Exercise 3 *(4 points) Is the language $a^i b^n c^i d^n$ context free? If yes, provide a grammar. If no, use the pumping lemma to show it is not.*