CS 334 - Homework 2 (Regular Languages) ←[0-indexed!]
Due 3/29/2016

Construction of Context-Free Languages

1. Define a context-free grammar which accepts any valid mathematical expression over the alphabet {0, 1, 2, 3, 4, 5, 6, 7, 8, 8, +}.

2. Define a context-free grammar which accepts any palindrome over the alphabet {0, 1}.

Construction of Pushdown Automata

1. Define a pushdown-automaton which accepts any string over the alphabet {0, 1} for which there are the same number of "0"s as "1"s.

2. Let w, z be strings over the alphabet {0, 1, $}. Define a pushdown-automaton which accepts any string $w\$z$, where w^{-1} is a subsequence of z, and both w and z do not contain "$".

   Ex: "**110**$0**01**00**1**"
   Ex: "**0101**$0**1**0**01**11**0**101"

Pumping Lemma

1. Let Σ = {0, 1}. Prove that the set $\{w^2 \mid w \in \Sigma^*\}$ is not context-free.

2.