

CSE625 Homework 6
Due Feb 25

1. Design Pushdown automata for each of the following languages:
 - (a) $\{ a^i b a^{3i} : i \geq 1 \}$.
 - (b) $\{ w \in \{a, b, c\}^* : \text{the number of } a\text{'s plus the number of } b\text{'s equals the number of } c\text{'s in } w \}$.
 - (c) $\{ a^i b^j c^k : j < i + k, i, j, k \geq 0 \}$.
 - (d) $\{ a^i b^j : 2j \geq i \geq j \geq 0 \}$.
 - (e) $\{ a^i b^j : i + j \text{ is a multiple of } 3 \}$.
2. Construct a pushdown automaton which accepts the language generated by the context-free grammar over the alphabet set $\{a, b\}$ where the production rules P are:

$$\begin{aligned} S &\rightarrow aUb \\ U &\rightarrow \Lambda \\ U &\rightarrow WW \\ W &\rightarrow VaS \\ W &\rightarrow a \\ V &\rightarrow bb \\ V &\rightarrow Wb \end{aligned}$$

(The grader will only grade a subset of these problems.)