CS 373 Homework 6 Anchu A. Lee
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1. Exercise 2.1
   a.
   b.
   c.
   d.
2. Construct a pushdown automata that recognizes

$$\{w \mid w \in \{0,1\}^* \text{ s.t. the number of 0's in } w = \text{the number of 1's in } w\}$$

3. Exercise 2.2
4. Exercise 2.4b
5. Give a CFG for

$$\{0^a 1^b 2^c 3^d 4^e 5^f \mid \text{such that } a, b, c, d, e, f \geq 0 \text{ and } a + b = d + e\}$$

6. Exercise 2.4e
7. Put the rules following in Chomsky normal form (assume that S is the new start variable)

$$\begin{aligned} S &\to aAA \mid aBC \mid abc \\ A &\to AA \mid Aa \mid ab \\ B &\to aaBC \mid BC \\ C &\to a \mid bc \end{aligned}$$

8. Exercise 2.15
9. Show the following is context free using a CFG

$$\{xy \mid x, y \in \{0,1\}^*, |x| = |y|, y \neq x^R\}$$

10. Construct a pushdown automata that recognizes

$\{w \mid w$ is an element of $\{a,b,c,d\}^*$ such that the number of a's in w plus the number of b's in w is equal to the number of c's in w plus the number of d's in $w\}$