

Q1. Construct Push Down Automata's for the following languages:

1. $\{ w \in \{a,b\}^* : w \text{ doesn't equal } xx \text{ for some } w \in \{a,b\}^* \}$
2. $\{ a^n b^m : m < 2n \text{ or } 2n < 3m \}$

Q2. Construct an empty stack Push Down Automata for the following language :

$$L = \{ w : w \in \{0,1\}^* , w \neq w^R \}$$

Q3. State and prove whether the following are CFG's or not (given that L is a context free language) using closure properties:

1. $L^{\wedge} = \{ x \in L : |x| \text{ is even } \}$.
2. $L^{\wedge} = \{ x \in L : |x| \geq 10 \}$.

Q4. Given a CFG that generates a language L, show that you can construct a PDA M with two states that accepts by final state.