

HW4

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1. Define a context-free grammar for the language $L = \{ 0^n 1^m 0^m 1^n \}$
Where S is the start production $S \rightarrow 0S1 \mid 1A0 \mid \epsilon$ $A \rightarrow 1A0 \mid \epsilon$
2. Define a context-free grammar for the language $L = \{ a^n b^m : n \leq 3m \}$
Where S is the start production $S \rightarrow Bb \mid \epsilon$ $B \rightarrow Cb \mid \epsilon$ $C \rightarrow Db \mid \epsilon$
 $D \rightarrow Db \mid aS \mid \epsilon$
3. The truth value of a logical expression is defined recursively as: Where
S is the start production $S \rightarrow (A) = T \mid (B) = F$
 $A \rightarrow T \mid (A \wedge A) \mid (A \vee B) \mid (A \vee A) \mid (F \vee A) \mid \neg(B)$
 $B \rightarrow F \mid (B \wedge A) \mid (A \wedge B) \mid (B \vee B) \mid (B \wedge B) \mid \neg(A)$