HW4

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18 September ,2017

1. Define a context-free grammar for the language $L = \{\ 0^n 1^m 0^m 1^n\}$ Where S is the start production G = $\{\ (S, A), (0, 1), S, P\}$
$P = \{$
$S \to 0S1|1A0|\epsilon$,
$A \to 1A0|\epsilon$, $\}$

2. Define a context-free grammar for the language $L = \{\ a^n b^m : n \leq 3m\}$ Where S is the start production G = $\{\ (S, B, C), (a, b), S, P\}$
$P = \{$
$S \to aB|Sb|b|\epsilon$,
$B \to aC|Bb|b$,
$C \to aSb|Db|b$
$\}$

3. The truth value of a logical expression is defined recursively as: Where S is the start production G = $\{\ (S, A, B), (t, f, \wedge, \vee, \neg, (,), =), S, P\}$
$P = \{$
$S \to A = t|B = f$,
$A \to t|(A \wedge A)|(A \vee B)|(A \vee A)|(F \vee A)|\neg(B)$,
$B \to f|(B \wedge A)|(A \wedge B)|(B \vee B)|(B \wedge B)|\neg(A)$ $\}$