

CSC310 Procedure-Oriented Programming Languages

Homework 3 (Due: Friday, February 23, 2024)

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(Note) You can write (or type) the answers for each question directly on this page.

Find a context-free grammar for each of the following languages L_1 , L_2 , and L_3 :

Q1. $L_1 = \{ 0^n 1^n \mid n \geq 1 \}$

Answer:

$S \rightarrow 01 \mid 0S1$

Q2. $L_2 = \{ ww^r \mid w \in \{a, b\}^+ \}$

Answer:

$S \rightarrow aa \mid bb \mid aSa \mid bSb$

Q3. $L_3 = \{ \text{strings of balanced (a.k.a. matching) parentheses} \} = \{ (), (()), ()(()), \dots \}$

Answer:

$S \rightarrow A(A)A$

$A \rightarrow S \mid \lambda$