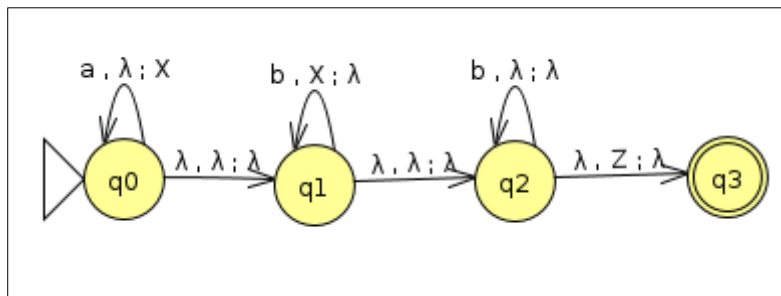


Lista de Exercícios 12

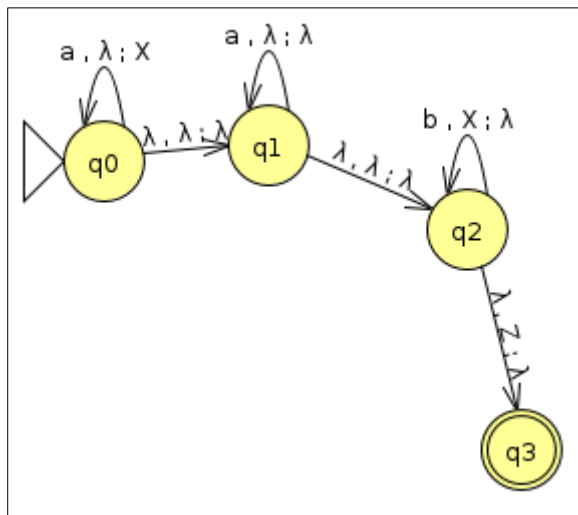
1. Crie Autômatos de Pilha e as Gramáticas Livres de Contexto para as linguagens a seguir:

a) $L4 = \{a^x b^y \mid x \leq y\}$



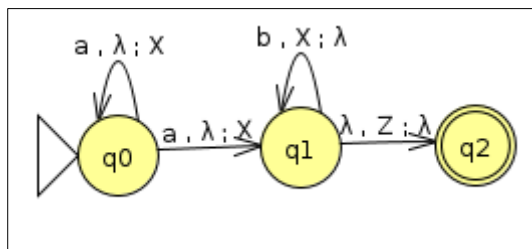
$S \rightarrow aAb \mid \langle \text{epsilon} \rangle$
 $A \rightarrow S \mid Sb$

b) $L5 = \{a^x b^y \mid x \geq y\}$

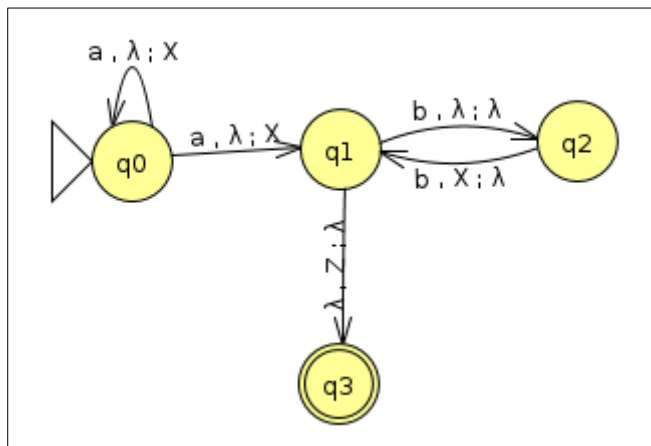


$S \rightarrow aAb \mid \langle \text{epsilon} \rangle$
 $A \rightarrow S \mid aS$

c) $L6 = \{a^x b^x \mid x \geq 1\} \cup \{a^x b^{2x} \mid x \geq 1\}$



$S \rightarrow aAb$
 $A \rightarrow S \mid \langle \text{epsilon} \rangle$



$S \rightarrow aAbb$
 $A \rightarrow S \mid \langle \text{epsilon} \rangle$

2. Forneça a Forma Normal Chomsky para as GLCs abaixo:

a) $S \rightarrow aSa \mid bSb \mid a \mid b \mid aa \mid bb$

$S \rightarrow CA \mid DB \mid a \mid b \mid aa \mid bb$

$A \rightarrow SC$

$B \rightarrow SD$

$C \rightarrow a$

$D \rightarrow b$

b) $S \rightarrow bA \mid aB,$

$A \rightarrow bAA \mid aS \mid a$

$B \rightarrow aBB \mid bS \mid b$

$S \rightarrow GA \mid EC$

$A \rightarrow GD \mid ES \mid a$

$B \rightarrow EF \mid GS \mid b$

$C \rightarrow BH$

$D \rightarrow AA$

$E \rightarrow a$

$F \rightarrow BB$

$G \rightarrow b$

$H \rightarrow ,$

c) $S \rightarrow Aba$

$A \rightarrow aab$

$B \rightarrow AC$

$S \rightarrow AC$

$B \rightarrow ED$

$C \rightarrow FE$

$D \rightarrow EF$

$E \rightarrow a$

$F \rightarrow b$

d) $S \rightarrow 0A0 \mid 1B1 \mid BB$

$A \rightarrow C$

$B \rightarrow S \mid A$

$C \rightarrow S \mid \langle \text{epsilon} \rangle$

$S \rightarrow CE \mid DF \mid BB \mid CC \mid DD$

$A \rightarrow CE \mid DF \mid BB \mid CC \mid DD$

$B \rightarrow CE \mid DF \mid BB \mid CC \mid DD$

$C \rightarrow 0$

$D \rightarrow 1$

$E \rightarrow AC$

$F \rightarrow BD$

e) $S \rightarrow aAa \mid bBb \mid \langle \text{epsilon} \rangle$

$A \rightarrow C \mid a$

$B \rightarrow C \mid b$

$C \rightarrow CDE \mid \langle \text{epsilon} \rangle$

$D \rightarrow A \mid B \mid ab$

$S \rightarrow AC \mid BD \mid AA \mid BB$

$A \rightarrow a$

$B \rightarrow b$

$C \rightarrow AA$

$D \rightarrow BB$