Lenguajes y Autómatas I

RESPUESTA DE LA TAREA 18

1. Encuentre una **GLC** que genere cada uno de los siguientes lenguajes:

a) $L = \{ \mathbf{a}^n \mathbf{b}\mathbf{c}^{n+1} \mid n > 0 \}$	$S \to \mathbf{a}S\mathbf{c} \mid \mathbf{bc}$
b) $L = \{ \mathbf{a}^m\mathbf{b}^n \mid m > n \geq 0 \}$	$S \to \mathbf{a}S\mathbf{b} \mid \mathbf{a}S \mid \mathbf{a}$
c) $L = \{ \mathbf{a}^{n+2}\mathbf{b}^n \mid n > 0 \}$	$S \to \mathbf{a}S\mathbf{b} \mid \mathbf{aa}$
d) $L = \{ \mathbf{a}^{2n}\mathbf{b}\mathbf{c}^n \mid n > 0 \}$	$S \to \mathbf{aa}S\mathbf{c} \mid \mathbf{b}$
e) $L = \{ \mathbf{a}^n\mathbf{b}^m\mathbf{c}^{n+m} \mid n \geq 0 \text{ y } m \geq 0 \}$	$S \to \mathbf{a}S\mathbf{c} \mid A$ $A \to \mathbf{b}A\mathbf{c} \mid \varepsilon$
f) $L = \{ \mathbf{a}^n\mathbf{b}^m\mathbf{c}^m\mathbf{a}^n \mid n \geq 0, m \geq 0 \}$	$S \to \mathbf{a}S\mathbf{a} \mid A$ $A \to \mathbf{b}A\mathbf{c} \mid \varepsilon$
g) $L = \{ \mathbf{a}^n\mathbf{b}^n\mathbf{c}^m\mathbf{d}^m \mid n \geq 0 \text{ y } m \geq 0 \}$	$S \to AB$ $A \to \mathbf{a}A\mathbf{b} \mid \varepsilon$ $B \to \mathbf{c}B\mathbf{d} \mid \varepsilon$
h) $L = \{ \mathbf{a}^n\mathbf{b}^{n+m}\mathbf{c}^m \mid n \geq 0 \text{ y } m \geq 0 \}$	$S \to AB$ $A \to \mathbf{a}A\mathbf{b} \mid \varepsilon$ $B \to \mathbf{b}B\mathbf{c} \mid \varepsilon$
i) $L = \{ \mathbf{a}^m\mathbf{b}^n \mid m \neq n \}$	$S \to AB$ $A \to \mathbf{a}A\mathbf{b} \mid \mathbf{a}A \mid \mathbf{a}$ $B \to \mathbf{a}B\mathbf{b} \mid B\mathbf{b} \mid \mathbf{b}$
j) $L = \{ \mathbf{a}^m\mathbf{b}^n \mid 0 \leq n \leq m \leq 2n \}$	$S \to \mathbf{a}S\mathbf{b} \mid \mathbf{aa}S\mathbf{b} \mid \varepsilon$
k) $L = \{ \mathbf{a}^n\mathbf{b}^{n+m}\mathbf{c}^{2m} \mid m \geq 0, n \geq 0 \}$	$S \to AB$ $A \to \mathbf{a}A\mathbf{b} \mid \varepsilon$ $B \to \mathbf{b}B\mathbf{cc} \mid \varepsilon$
l) $L = \{ \mathbf{a}^m\mathbf{b}^n\mathbf{c}^p \mid n > m + p \}$	$S \to ABC$ $A \to \mathbf{a}A\mathbf{b} \mid \varepsilon$ $B \to \mathbf{b}B \mid \mathbf{b}$ $C \to \mathbf{b}C\mathbf{c} \mid \varepsilon$
m) $L = \{ w \in \{\mathbf{a}, \mathbf{b}\}^* \mid w = w^R \}$	$S \to \mathbf{b}S\mathbf{b} \mid \mathbf{a}S\mathbf{a} \mid \mathbf{a} \mid \mathbf{b} \mid \varepsilon$
n) $L = \{ w \in \{\mathbf{a}, \mathbf{b}\}^* \mid w \neq w^R \}$	$S \to \mathbf{b}S\mathbf{b} \mid \mathbf{a}S\mathbf{a} \mid \mathbf{b}A\mathbf{a} \mid \mathbf{a}A\mathbf{b}$ $A \to \mathbf{a}A \mid \mathbf{b}A \mid \varepsilon$
o) $L = \{ \mathbf{a}^{n+m}\mathbf{b}^m\mathbf{c}^n \mid n \geq 0, m \geq 0 \}$	$S \to \mathbf{a}S\mathbf{c} \mid A$ $A \to \mathbf{a}A\mathbf{b} \mid \varepsilon$
p) $L = \{ \mathbf{a}^n\mathbf{b}^{2n}\mathbf{c}^m \mid n \geq 0, m \geq 0 \}$	$S \to AB$ $A \to \mathbf{a}A\mathbf{bb} \mid \varepsilon$ $B \to \mathbf{c}B \mid \varepsilon$
q) $L = \{ \mathbf{a}^{n+2}\mathbf{b}^m\mathbf{c}^n \mid n \geq 0, m \geq 0 \}$	$S \to \mathbf{aa}S\mathbf{c} \mid A$ $A \to \mathbf{b}A \mid \varepsilon$

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r) $L = \{ \mathbf{a}^{n+2}\mathbf{b}^m\mathbf{c}^m\mathbf{d}^n \mid n > 0, m > 0 \}$

$S \rightarrow \mathbf{a}S\mathbf{d} \mid \mathbf{aaa}A\mathbf{d}$

$A \rightarrow \mathbf{b}A\mathbf{c} \mid \mathbf{bc}$

s) $L = \{ \mathbf{a}^n\mathbf{b}^m \mid n > 2m \}$

$S \rightarrow \mathbf{a}S\mathbf{c} \mid \mathbf{a}A\mathbf{c}$

$A \rightarrow \mathbf{b}A \mid \mathbf{b}$

t) $L = \{ \mathbf{a}^n\mathbf{b}^m\mathbf{c}^n \mid n, m > 0 \}$

$S \rightarrow \mathbf{aa}S\mathbf{b} \mid \mathbf{a}S \mid \mathbf{a}$

u) $L = \{ x\mathbf{a}y \mid x, y \in \{ \mathbf{a}, \mathbf{b} \}^*, |x| = |y| \}$

$S \rightarrow \mathbf{a}S\mathbf{a} \mid \mathbf{a}S\mathbf{b} \mid \mathbf{b}S\mathbf{a} \mid \mathbf{b}S\mathbf{b} \mid \mathbf{a}$