

Autómatas y lenguajes formales

Taller 1

Integrantes:

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Condiciones

1. La clave debe tener una longitud exacta de 14 caracteres.
2. Las posiciones 1-3 deben ser letras mayúsculas (A-Z).
3. Las posiciones 4-7 corresponden a cuatro dígitos, donde el primero no puede ser cero.
3. La posición 8 debe ser el carácter especial
4. Las posiciones 9-12 corresponden a una combinación de letras minúsculas (a-z) y dígitos.
5. (0-9), con al menos un dígito y al menos una letra.
6. Las posiciones 13-14 deben ser dos letras mayúsculas que representen la región.

Alfabeto

$$\Sigma = \{A-Z, a-z, 0-9, _ \}$$

Lenguaje Regular

$$LR = \{ w \in \Sigma^* / w = (A-Z)^3(1-9)(0-9)^3_ (a-z0-9)^4(A-Z)^2 \}$$

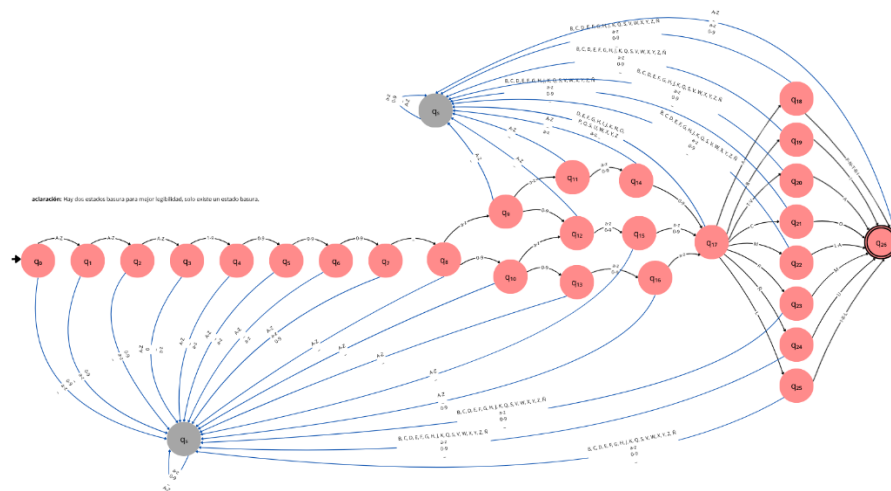
Autómata finito determinístico (AFD)

$$Q = \{q_0, q_1, q_2, q_3, q_4, q_5, q_6, \dots, q_{26}, q_{27}\}$$

$$\Sigma = \{A-Z, a-z, 0-9, _ \}$$

\mathbf{q}_0 es el estado inicial

$$\mathbf{F} = \{q_{26}\}$$



► δ :

[illegible]

(Click para ver las imágenes más grandes)

$\delta'(q_0, A-Z) = q_1$	$\delta'(q_6, 0-9) = q_7$	$\delta'(q_{12}, a-z) = q_{15}$	$\delta'(q_{19}, A-Z) = q_{26}$	$\delta'(q_{25}, A-Z) = q_{26}$
$\delta'(q_0, a-z) = q_s$	$\delta'(q_6, A-Z) = q_s$	$\delta'(q_{12}, 0-9) = q_{15}$	$\delta'(q_{19}, a-z) = q_s$	$\delta'(q_{25}, a-z) = q_s$
$\delta'(q_0, 0-9) = q_s$	$\delta'(q_6, a-z) = q_s$	$\delta'(q_{12}, A-Z) = q_s$	$\delta'(q_{19}, 0-9) = q_s$	$\delta'(q_{25}, 0-9) = q_s$
$\delta'(q_0, _) = q_s$	$\delta'(q_6, _) = q_s$	$\delta'(q_{12}, _) = q_s$	$\delta'(q_{19}, _) = q_s$	$\delta'(q_{25}, _) = q_s$
$\delta'(q_1, A-Z) = q_2$	$\delta'(q_7, _) = q_8$	$\delta'(q_{13}, 0-9) = q_{16}$	$\delta'(q_{20}, A-Z) = q_{26}$	$\delta'(q_{26}, A-Z) = q_s$
$\delta'(q_1, a-z) = q_s$	$\delta'(q_7, A-Z) = q_s$	$\delta'(q_{13}, a-z) = q_{15}$	$\delta'(q_{20}, a-z) = q_s$	$\delta'(q_{26}, a-z) = q_s$
$\delta'(q_1, 0-9) = q_s$	$\delta'(q_7, a-z) = q_s$	$\delta'(q_{13}, A-Z) = q_s$	$\delta'(q_{20}, 0-9) = q_s$	$\delta'(q_{26}, 0-9) = q_s$
$\delta'(q_1, _) = q_s$	$\delta'(q_7, 0-9) = q_s$	$\delta'(q_{13}, _) = q_s$	$\delta'(q_{20}, _) = q_s$	$\delta'(q_{26}, _) = q_s$
$\delta'(q_2, A-Z) = q_3$	$\delta'(q_8, a-z) = q_9$	$\delta'(q_{14}, 0-9) = q_{17}$	$\delta'(q_{21}, A-Z) = q_{26}$	$\delta'(q_s, A-Z) = q_s$
$\delta'(q_2, a-z) = q_s$	$\delta'(q_8, 0-9) = q_{10}$	$\delta'(q_{14}, a-z) = q_s$	$\delta'(q_{21}, a-z) = q_s$	$\delta'(q_s, a-z) = q_s$
$\delta'(q_2, 0-9) = q_s$	$\delta'(q_8, A-Z) = q_s$	$\delta'(q_{14}, A-Z) = q_s$	$\delta'(q_{21}, 0-9) = q_s$	$\delta'(q_s, 0-9) = q_s$
$\delta'(q_2, _) = q_s$	$\delta'(q_8, _) = q_s$	$\delta'(q_{14}, _) = q_s$	$\delta'(q_{21}, _) = q_s$	$\delta'(q_s, _) = q_s$
$\delta'(q_3, 1-9) = q_4$	$\delta'(q_9, a-z) = q_{11}$	$\delta'(q_{15}, a-z) = q_{17}$	$\delta'(q_{22}, A-Z) = q_{26}$	
$\delta'(q_3, 0) = q_s$	$\delta'(q_9, 0-9) = q_{12}$	$\delta'(q_{15}, 0-9) = q_{17}$	$\delta'(q_{22}, a-z) = q_s$	
$\delta'(q_3, A-Z) = q_s$	$\delta'(q_9, A-Z) = q_s$	$\delta'(q_{15}, A-Z) = q_s$	$\delta'(q_{22}, 0-9) = q_s$	
$\delta'(q_3, a-z) = q_s$	$\delta'(q_9, _) = q_s$	$\delta'(q_{15}, _) = q_s$	$\delta'(q_{22}, _) = q_s$	
$\delta'(q_3, _) = q_s$	$\delta'(q_{10}, 0-9) = q_{13}$	$\delta'(q_{16}, a-z) = q_{17}$	$\delta'(q_{23}, A-Z) = q_{26}$	
$\delta'(q_4, 0-9) = q_5$	$\delta'(q_{10}, a-z) = q_{12}$	$\delta'(q_{16}, 0-9) = q_s$	$\delta'(q_{23}, a-z) = q_s$	
$\delta'(q_4, A-Z) = q_s$	$\delta'(q_{10}, A-Z) = q_s$	$\delta'(q_{16}, A-Z) = q_s$	$\delta'(q_{23}, 0-9) = q_s$	
$\delta'(q_4, a-z) = q_s$	$\delta'(q_{10}, _) = q_s$	$\delta'(q_{16}, _) = q_s$	$\delta'(q_{23}, _) = q_s$	
$\delta'(q_4, _) = q_s$	$\delta'(q_{11}, a-z) = q_{14}$	$\delta'(q_{17}, A-Z) = q_{18}$	$\delta'(q_{24}, A-Z) = q_{26}$	
$\delta'(q_5, 0-9) = q_6$	$\delta'(q_{11}, 0-9) = q_{12}$	$\delta'(q_{17}, a-z) = q_s$	$\delta'(q_{24}, a-z) = q_s$	
$\delta'(q_5, A-Z) = q_s$	$\delta'(q_{11}, A-Z) = q_s$	$\delta'(q_{17}, 0-9) = q_s$	$\delta'(q_{24}, 0-9) = q_s$	
$\delta'(q_5, a-z) = q_s$	$\delta'(q_{11}, _) = q_s$	$\delta'(q_{17}, _) = q_s$	$\delta'(q_{24}, _) = q_s$	
$\delta'(q_5, _) = q_s$		$\delta'(q_{18}, A-Z) = q_{26}$		
		$\delta'(q_{18}, a-z) = q_s$		
		$\delta'(q_{18}, 0-9) = q_s$		
		$\delta'(q_{18}, _) = q_s$		

Gramática

$G = (V, \Sigma, S, P)$

$\Sigma = \{A-Z, a-z, 0-9, _ \}$

$V = \{S, A, B, C, D, E, F, G, H, I, J, K\}$

S = Símbolo inicial

$P = \{$

- (1) $S \rightarrow A B$
- (2) $A \rightarrow L L L$
- (3) $L \rightarrow A | B | C | \dots | Z$
- (4) $B \rightarrow D N N N C$
- (5) $D \rightarrow 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9$
- (6) $N \rightarrow 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9$
- (7) $C \rightarrow _ E$
- (8) $E \rightarrow Z Z Z Z F$
- (9) $Z \rightarrow a | b | \dots | z | 0 | 1 | \dots | 9$
- (10) $F \rightarrow R R$
- (11) $R \rightarrow A | B | \dots | Z$

$\}$

Ejemplo de derivación

$W = \text{ICN2020_a1b2RM}$

S

S

$\Rightarrow (1) A B$

$\Rightarrow (2) L L L B$

$\Rightarrow (3) I C N B$

⇒(4) I C N D N N N C
⇒(5) I C N 2 N N N C
⇒(6) I C N 2 0 N N C
⇒(6) I C N 2 0 2 N C
⇒(6) I C N 2 0 2 0 C
⇒(7) I C N 2 0 2 0 _ E
⇒(8) I C N 2 0 2 0 _ Z Z Z Z F
⇒(9) I C N 2 0 2 0 _ a 1 b 2 F
⇒(10) I C N 2 0 2 0 _ a 1 b 2 R R
⇒(11) I C N 2 0 2 0 _ a 1 b 2 R M

Código

Instrucciones:

Llevar el archivo *taller1.py* a una carpeta, luego ejecutarlo, lo demás es interactivo. (Llevarlo a una carpeta porque genera un archivo .json)