Tarea 1

Resumen

384 a.C
- Aristoteles
- Padre fundador de la lógica.

1760 – 1840
- Revolución Industrial
- Creación de máquinas capaces de realizar las tareas de un ser humano.

1937
- Kurt Gödel -> Teorema de la incompletitud, en el que demostraba que era imposible la completa axiomatización de las matemáticas.

1930
- Alan Touring
- Creación de la máquina de Touring

1940
- Se crearon máquinas simples, denominadas autómata finitos.

1946
- Se desarrolló la primera computadora digital, aquí nace el lenguaje máquina

1950
- Avram Noam Chomsky
- Clasificación de grámatica formal de acuerdo a una jerarquia de cuatro niveles
- John Backus -> Investigó el lenguaje algebraico

1956
- Stephen Klenee
- Clausura de Klenee en expresiones regulares
- Edward F. Moore -> Primero en utilizar las máquinas de estados de tipo finito

1957
- Claude Shannon
- Aplicó la lógica matemática en circuitos combinatorios a partir de la teoria de las máquinas secuenciales.

1960
- Los autómatas programables se introducen en la industria

1969
- Stephen A. Cook -> Extendió el estudio de Alan Touring

Ejercicio

Dado el siguiente conjunto:

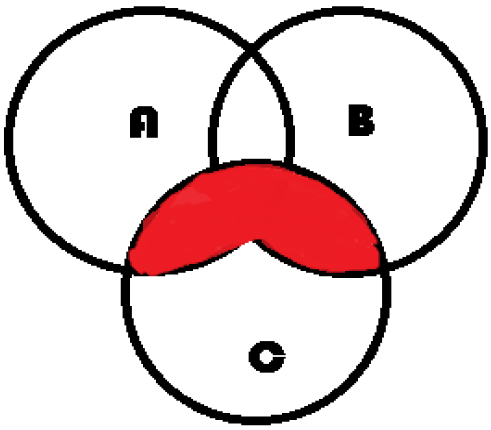
$A = \{a, b, c\}$ $B = \{a, \#, c\}$ $C = \{a, \phi\}$

Encontrar lo siguiente:

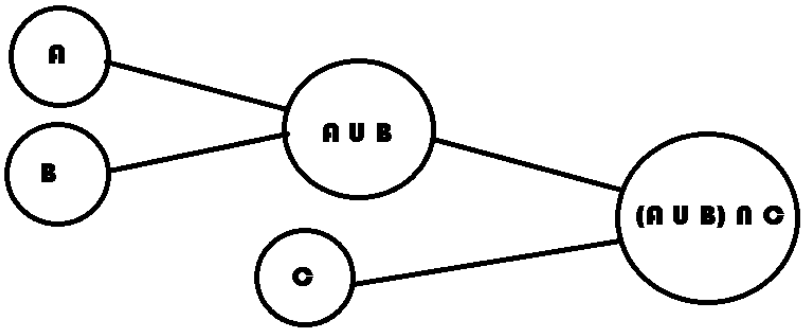
$a)\ (A \cup B) \cap C$

- ⇨ $(A \cup B) = \{a, b, c, \#\}$
- ⇨ $(A \cup B) \cap C = \{a\}$

Diagrama de Venn



Grafo



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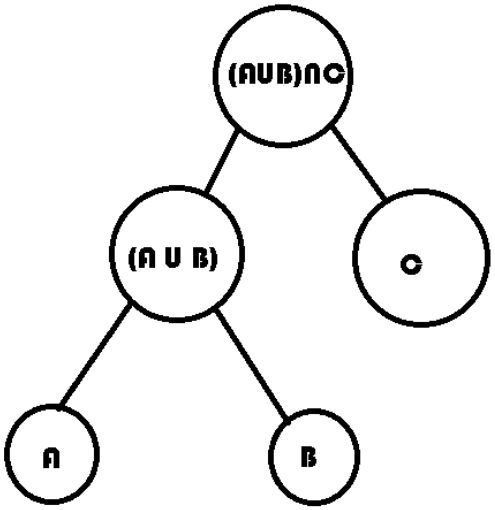
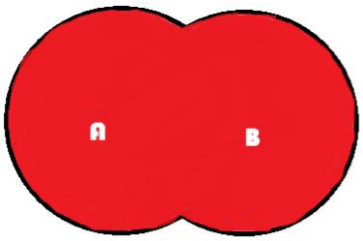


b) $(A \cup B)^*$

- $(A \cup B) = \{a, b, c, \#\}$
- $(A \cup B) = Z \therefore Z^* = Z \cdot Z = \{ \phi, \lambda, a, b, c, \#, (a, a), (a, b), (a, c), (a, \#), (b, a), (b, b), (b, c), (b, \#), (c, a), (c, b), (c, c), (c, \#), (\#, a), (\#, b), (\#, c), (\#, \#)\}$

Diagrama de Venn



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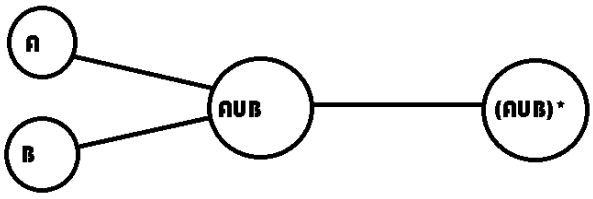

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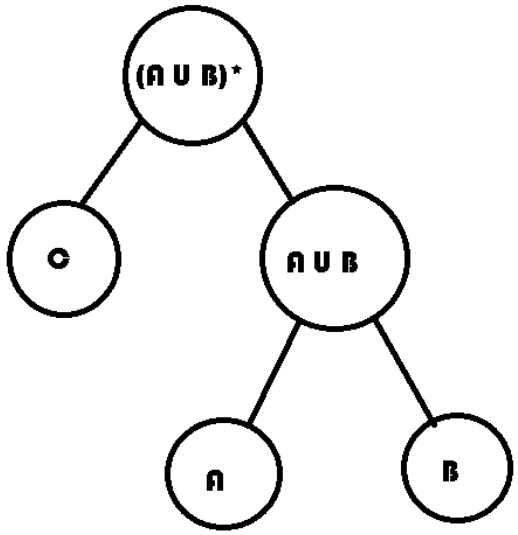
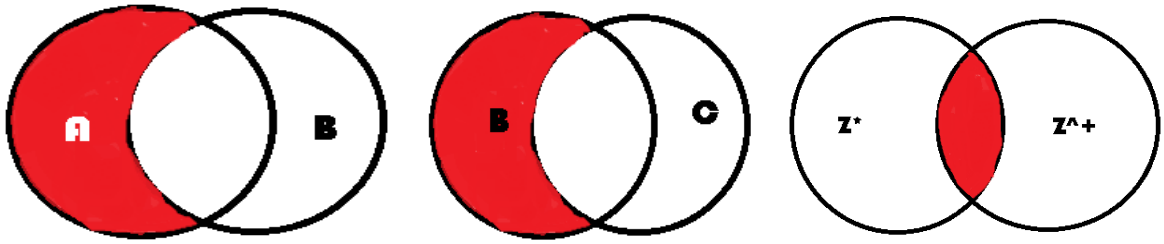


$c)\ (A-B)^* \cap (B-C)^+$

- ⇨ $(A-B) = \{b\}$
- ⇨ $(A-B) = Z \therefore Z^* = Z \cdot Z = \{\phi, \lambda, b, (b, b)\}$
- ⇨ $(B-C) = \{\#, c\}$
- ⇨ $(B-C) = Z \therefore Z^+ = Z \cdot Z = \{(\#, \#), (\#, c), (c, \#), (c, c)\}$
- ⇨ $Z^* \cap Z^+ = \{\}$

Diagrama de Venn



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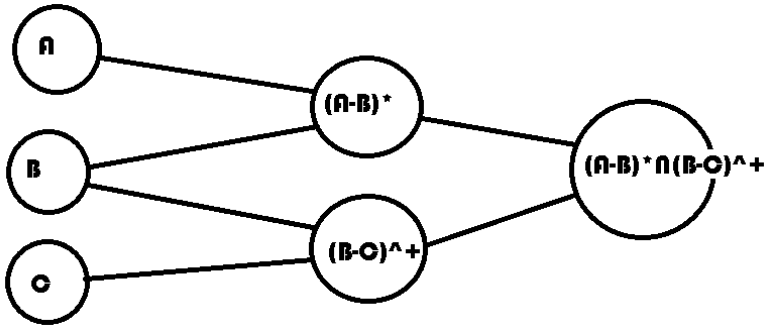

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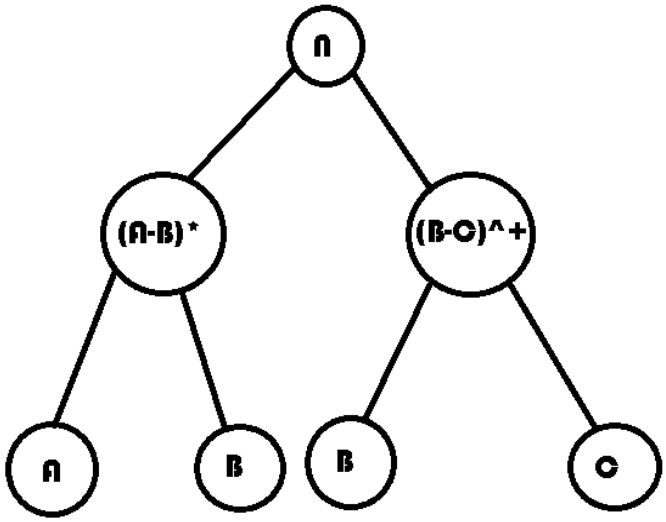
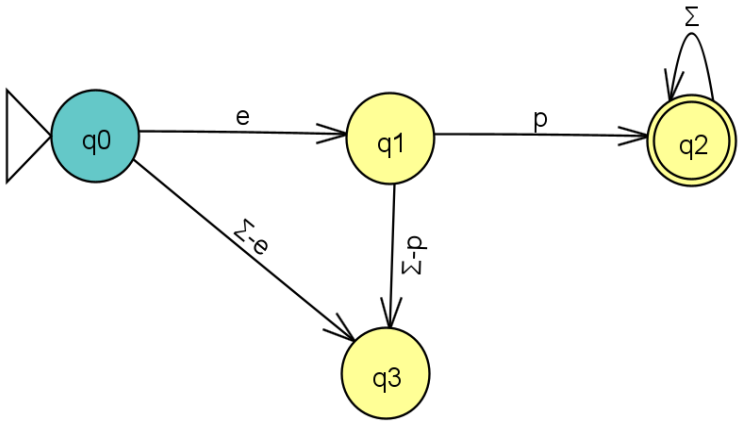


Ejercicios Hechos en Clases

Dado el grafo



ep	Accept
peΣ	Reject
ep	Accept
epΣ	Accept
epepepep	Reject
epΣ	Accept
epepepΣ	Reject
ep	Accept
epΣΣΣΣ...	Accept

$Q = \{q_0, q_1, q_2, q_3\}$

$\Sigma = \{e, p, \Sigma, \Sigma - \mathrm{e}, \Sigma - \mathrm{p}\}$

$q_0 = \{q_0\}$

$f = \{q_2\}$

$L(\Sigma) = \{ep(\Sigma)^+\}$

Tabla de Transición

Δ	e	p	Σ	$\Sigma - \mathrm{e}$	$\Sigma - \mathrm{p}$
q_0	q_1			q_3	
q_1		q_2			q_3
q_2			q_2		q_3
q_3					

Expresiones Regulares Válidas

epΣ → válida

epepep → no válida

peΣ → no válida

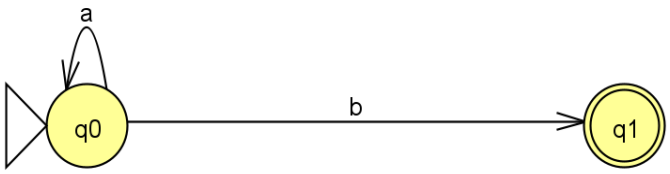
epΣΣΣΣ → *válida*

Dada un lenguaje $L = \{a^n b / n \geq 0\}$

Expresiones:

$n = 0 \implies a^0 b = b$
$n = 1 \implies a^1 b = ab$
$n = n \implies a^n b = a \ldots \ldots b$

Grafo



Input	Result
ab	Accept
abb	Reject
ab	Accept
aab	Accept
aaaaaaaaaab	Accept
aaaaaaab	Accept
aaaaaaaab	Accept
abaab	Reject
aaab	Accept

$Q = \{q_0, q_1\}$

$\Sigma = \{a, b\}$

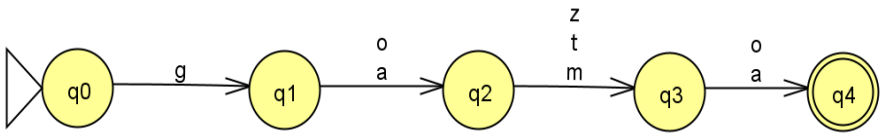
$q_0 = \{q_0\}$

$f = \{q_1\}$

Transición

Δ	a	b
q_0	q_0	q_1
q_1	q_1	q_1

Encontrar el autómata que genere la palabra gato, gamo, goma, gaza



Input	Result
gato	Accept
gamo	Accept
goma	Accept
gaza	Accept
goza	Accept
gama	Accept
gmgt	Reject

$Q = \{q_0, q_1, q_2, q_3, q_4\}$

$\Sigma = \{g, a, t, o, m, z\}$

$q_0 = \{q_0\}$

$f = \{q_4\}$

$L(\Sigma) = \{g(ao)^+(mzt)^+(ao)^+\}$

Transición

Δ	g	o	a	t	m	z
q_0	q_1					
q_1		q_2	q_2			
q_2				q_3	q_3	q_3
q_3		q_4	q_4			
q_4						

Dada una transición (tabla).

Δ	a	b	λ
* p	q		
q	p, r, s	p, r	s
r		p, s	s
* s			r

$Q = \{p, q, r, s\}$

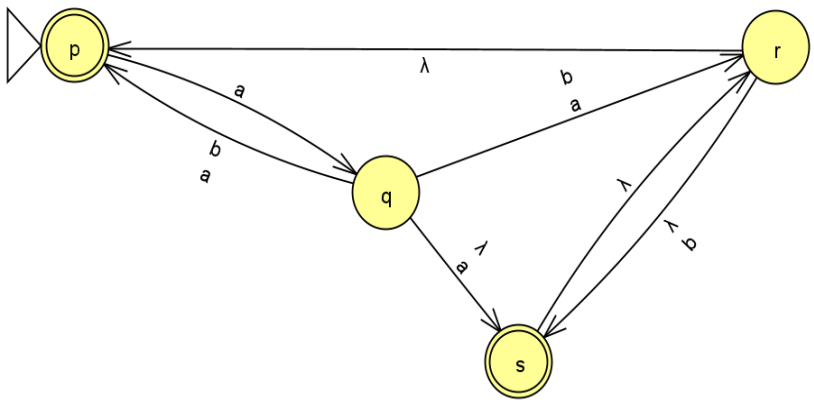
$\Sigma = \{a, b, \lambda\}$

$q_0 = \{p\}$

$f = \{p, s\}$

$L(\Sigma) = \{a(ab\lambda)^+(b\lambda)\}$

Grafo



Input	Result
aa	Accept
aab	Accept
a	Accept
a	Reject
ab	Accept