USAC
TRICENTENARIA
Universidad de San Carlos de Guatemala
INGENIERIA
CUNOC

Lenguajes Formales y de Programación

Práctica1: Trabajo teórico-práctico

Sección: A

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Quetzaltenango, 05 de octubre de 2021.

1. **Creación de la expresión regular que describa el patrón de cada token.**

1.1. **Identificador:**

Expresión regular: ([L])+.([0-9])*

1.2. **Número:**

Expresión regular: [0-9]+

1.3. **Decimal:**

Expresión regular: [0-9]+((.).(0-9)+)*

1.4. **Puntuación:**

Expresión regular: ((.)|(,)|(;)|(:))+

1.5. **Operador:**

Expresión regular: ((+)|(-)|(*)|(/)|(%))+

1.6. **Agrupación:**

Expresión regular: ((()|())|([)|(])|({)|(}))+

2. **Gramática regular de cada token.**

2.1. **Identificador:**

Diagrama autómata finito no determinista Método de Thomson: **Identificador**

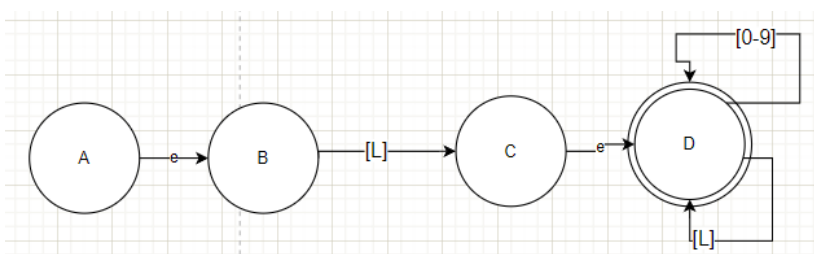


Tabla de transición

FT	e	L	[0-9]
A	{B}=s0	∂(s0,L)=C	{ (s0, [0-9]) } ={}
C	{D}=s1	∂{ (s1,L) } =D	∂(s2, [0-9]) =D

Optimizar - Tabla de transición

FT	e	L	[0-9]
A	{B}=s0	∂(s0,L)=s1	{ (s0, [0-9]) } ={}
C	{D}=s1	∂{ (s1,L) } =s1	∂(s2, [0-9]) =s1

Definición formal AFD: A=(Q,Σ,∂,A,F)

1.Q={s0, s1}

2.s0

3. Σ={[a-z], [A-Z], [0-9]}

4.F={s1}

5. Función de transición

∂(S0, [L]) = S1 ∂(S1, [0-9]) = S1

∂(S1, [L]) = S1

2.2. Número:

Diagrama autómata finito no determinista Método de Thomson: **Número**

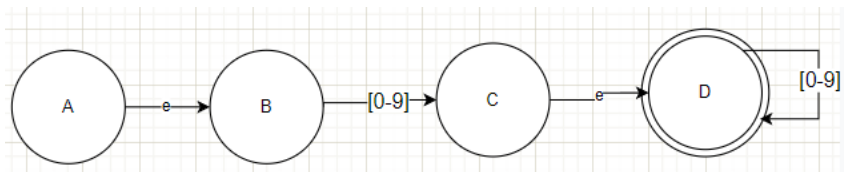


Tabla de transición

FT	e	[0-9]
A	{B}=s0	∂{ (s0, [0-9]) } =C
C	{D}=s1	∂(s1, [0-9]) =D

Optimizar - Tabla de transición

FT	e	[0-9]
A	{B}=s0	∂{ (s0, [0-9]) } =s1
C	{D}=s1	∂(s1, [0-9]) =s1

Definición formal AFD: A=(Q,Σ,∂,A,F)

1.Q={s0, s1}

2.s0

3. Σ={[0-9]}

4.F={s1}

5. Función de transición

∂(S0, [0-9]) = S1

∂(S1, [0-9]) = S1

2.3. Decimal:

Diagrama autómata finito no determinista Método de Thomson: **Decimal**

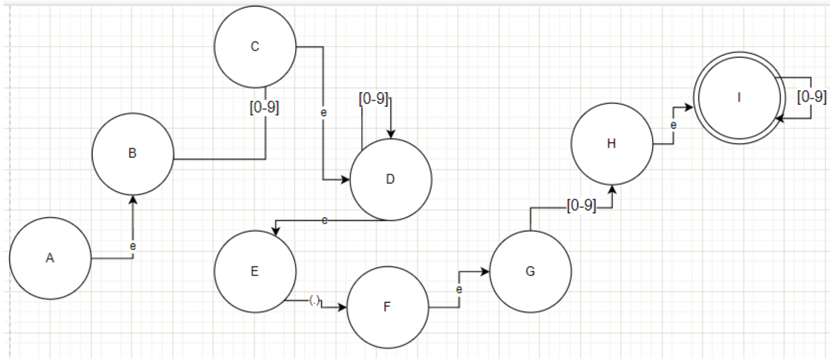


Tabla de transición

FT	e	[0-9]	.
A	{B}=s0	∂(s0, [0-9])=C	{ (s0, [.]) } ={}
C	{D}=s1	∂{ (s1, [0-9]) } =D	{ (s1, [.]) } ={}
D	{E}=s1	∂{ (s1, [0-9]) } ={}	∂{ (s1, [.]) } =F
F	{G}=s2	∂{ (s2, [0-9]) } =H	{ (s2, [.]) } ={}
H	{I}=s3	∂{ (s3, [0-9]) } =H	{ (s3, [.]) } ={}

Optimizar - Tabla de transición

FT	e	[0-9]	.
A	{B}=s0	∂(s0, [0-9])=s1	{ (s0, [.]) } ={}
C	{D}=s1	∂{ (s1, [0-9]) } =s1	{ (s1, [.]) } ={}
D	{E}=s1	∂{ (s1, [0-9]) } ={}	∂{ (s1, [.]) } =s2
F	{G}=s2	∂{ (s2, [0-9]) } =s3	{ (s2, [.]) } ={}
H	{I}=s3	∂{ (s3, [0-9]) } =s3	{ (s3, [.]) } ={}

Definición formal AFD: A=(Q,Σ,∂,A,F)

1.Q={s0, s1,s2,s3}

2.s0

3. Σ={[0-9],(.)}

4.F={s3}

5. Función de transición

∂(S0, [0-9]) = S1 ∂(S1, (.)) = S2

∂(S1, [0-9]) = S1

∂(S2, [0-9]) = S3

∂(S3, [0-9]) = S3

2.4. Puntuación:

Diagrama autómata finito no determinista Método de Thomson: **Puntuación**

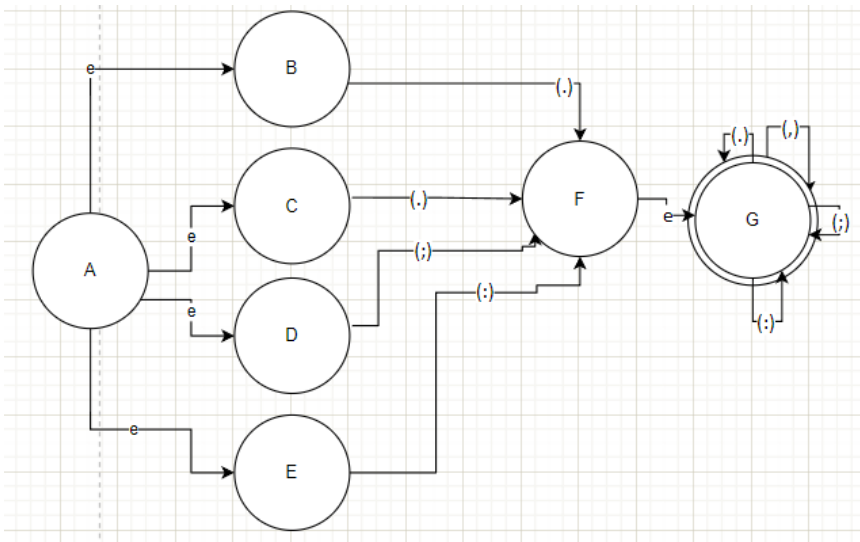


Tabla de transición

FT	e	.	,	;	:
A	{A,B,C,D,E}=s0	∂{ (s0, [.]) } =F	∂{ (s0, [,]) } =F	∂{ (s0, [;]) } =F	∂{ (s0, [:]) } =F
F	{G}=s1	∂{ (s1, [.]) } =G	∂{ (s1, [,]) } =G	∂{ (s1, [;]) } =G	∂{ (s1, [:]) } =G

Optimizar - Tabla de transición

FT	e	.	,	;	:
A	{A,B,C,D,E}=s0	∂{ (s0, [.]) } =s1	∂{ (s0, [,]) } =s1	∂{ (s0, [;]) } =s1	∂{ (s0, [:]) } =s1
F	{G}=s1	∂{ (s1, [.]) } =s1	∂{ (s1, [,]) } =s1	∂{ (s1, [;]) } =s1	∂{ (s1, [:]) } =s1

Definición formal AFD: A=(Q,Σ,∂,A,F)

1.Q={s0, s1}

2.s0

3. Σ={(.), (,), (;), (:)}

4.F={s1}

5. Función de transición

∂(S0, (.)) = S1   ∂(S0, (,)) = S1   ∂(S0, (;)) = S1   ∂(S0, (:)) = S1

∂(S1, (.)) = S1   ∂(S1, (,)) = S1   ∂(S1, (;)) = S1   ∂(S1, (:)) = S1

2.5. Operador:

Diagrama autómata finito no determinista Método de Thomson: **Operador**

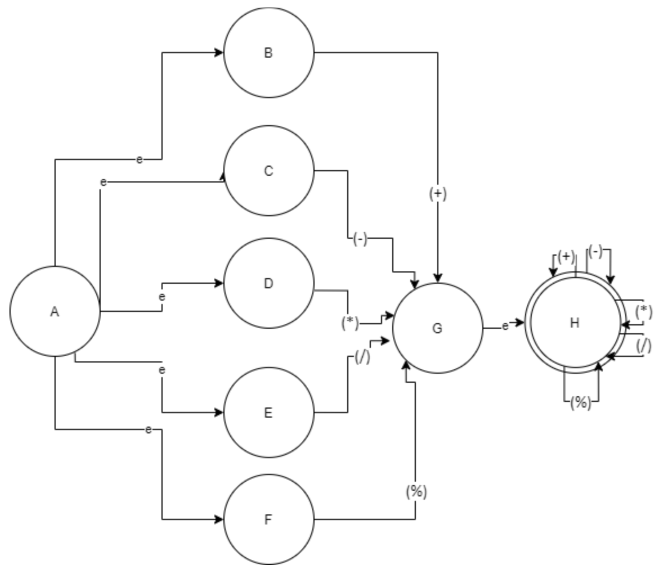


Tabla de transición

FT	e	+	-	*	/	%
A	{A,B,C,D,E,F}=s0	∂{ (s0, [+]) } =G	∂{ (s0, [-]) } =G	∂{ (s0, [*]) } =G	∂{ (s0, [/]) } =G	∂{ (s0, [%]) } =G
G	{H}=s1	∂{ (s1, [+]) } =H	∂{ (s1, [-]) } =H	∂{ (s1, [*]) } =H	∂{ (s1, [/]) } =H	∂{ (s1, [%]) } =H

Optimizar - Tabla de transición

FT	e	+	-	*	/	%
A	{A,B,C,D,E,F}=s0	∂{ (s0, [+]) } =s1	∂{ (s0, [-]) } =s1	∂{ (s0, [*]) } =s1	∂{ (s0, [/]) } =s1	∂{ (s0, [%]) } =s1
G	{H}=s1	∂{ (s1, [+]) } =s1	∂{ (s1, [-]) } =s1	∂{ (s1, [*]) } =s1	∂{ (s1, [/]) } =s1	∂{ (s1, [%]) } =s1

Definición formal AFD: A=(Q,Σ,∂,A,F)

1.Q={s0, s1}

2.s0

3. Σ={(+), (-), (*), (/), (%)}

4.F={s1}

5. Función de transición

∂(S0, (+)) = S1   ∂(S0, (-)) = S1   ∂(S0, (*)) = S1   ∂(S0, (/)) = S1   ∂(S0, (%)) = S1

∂(S1, (+)) = S1   ∂(S1, (-)) = S1   ∂(S1, (*)) = S1   ∂(S1, (/)) = S1   ∂(S1, (%)) = S1

2.6. Agrupación:

Diagrama autómata finito no determinista Método de Thomson: **Agrupación**

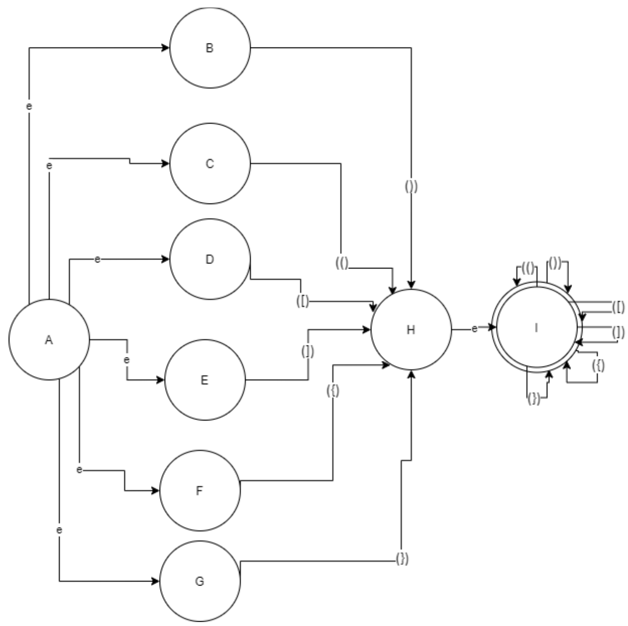


Tabla de transición

FT	e	(	)	[	]	{	}
A	{A,B,C,D,E,F,G}=s0	∂{ (s0, [(]) } =H	∂{ (s0, [)]) } =H	∂{ (s0, [[ ]) } =H	∂{ (s0, [ ]]) } =H	∂{ (s0, [{]) } =H	∂{ (s0, [}]) } =H
H	{I}=s1	∂{ (s1, [(]) } =I	∂{ (s1, [)]) } =I	∂{ (s1, [[ ]) } =I	∂{ (s1, [ ]]) } =I	∂{ (s1, [{]) } =I	∂{ (s1, [}]) } =I

Optimizar - Tabla de transición

FT	e	(	)	[	]	{	}
A	{A,B,C,D,E,F,G}=s0	∂{ (s0, [(]) } =S1	∂{ (s0, [)]) } =S1	∂{ (s0, [[ ]) } =S1	∂{ (s0, [ ]]) } =S1	∂{ (s0, [{]) } =S1	∂{ (s0, [}]) } =S1
H	{I}=s1	∂{ (s1, [(]) } =S1	∂{ (s1, [)]) } =S1	∂{ (s1, [[ ]) } =S1	∂{ (s1, [ ]]) } =S1	∂{ (s1, [{]) } =S1	∂{ (s1, [}]) } =S1

1.Q={s0, s1}

2.s0

3. Σ={((), ()), ([), (]), ({), (})}

4.F={s1}

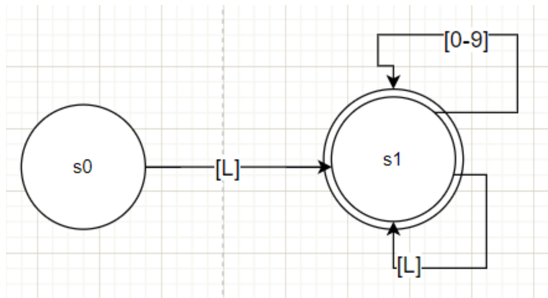
5. Función de transición

∂(S0, (()) = S1   ∂(S0, ())) = S1   ∂(S0, ([]) = S1   ∂(S0, (]]) = S1   ∂(S0, ({]) = S1   ∂(S0, (}]) = S1

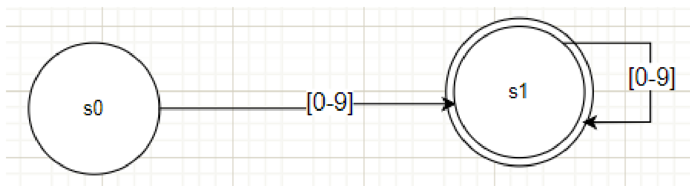
∂(S1, (()) = S1   ∂(S1, ())) = S1   ∂(S1, ([]) = S1   ∂(S1, (]]) = S1   ∂(S1, ({]) = S1   ∂(S1, (}]) = S1

3. AFD de cada token.

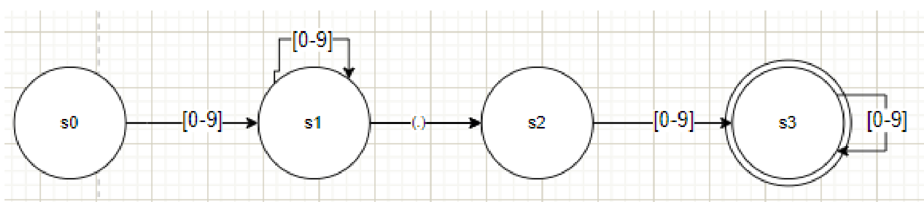
3.1. Identificador



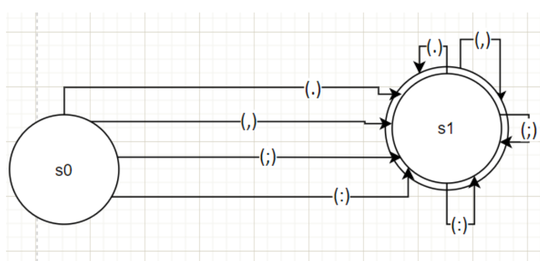
3.2.



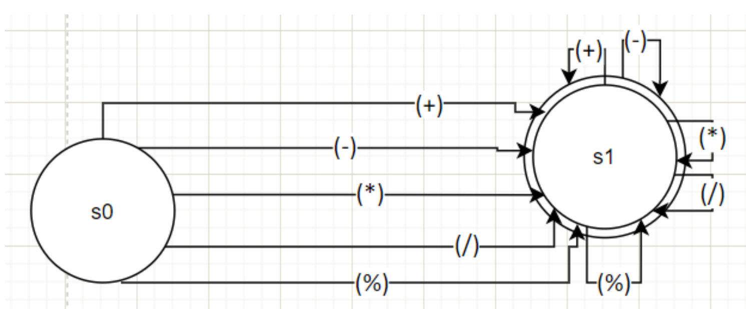
3.3.



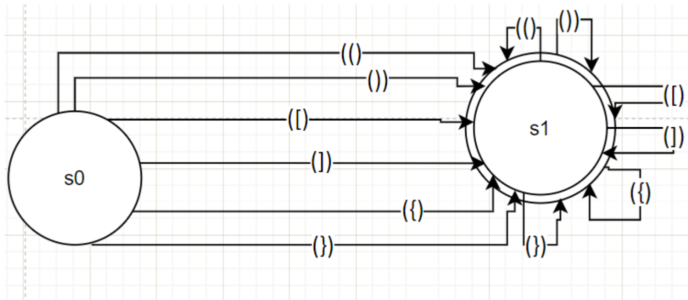
3.4.



3.5.

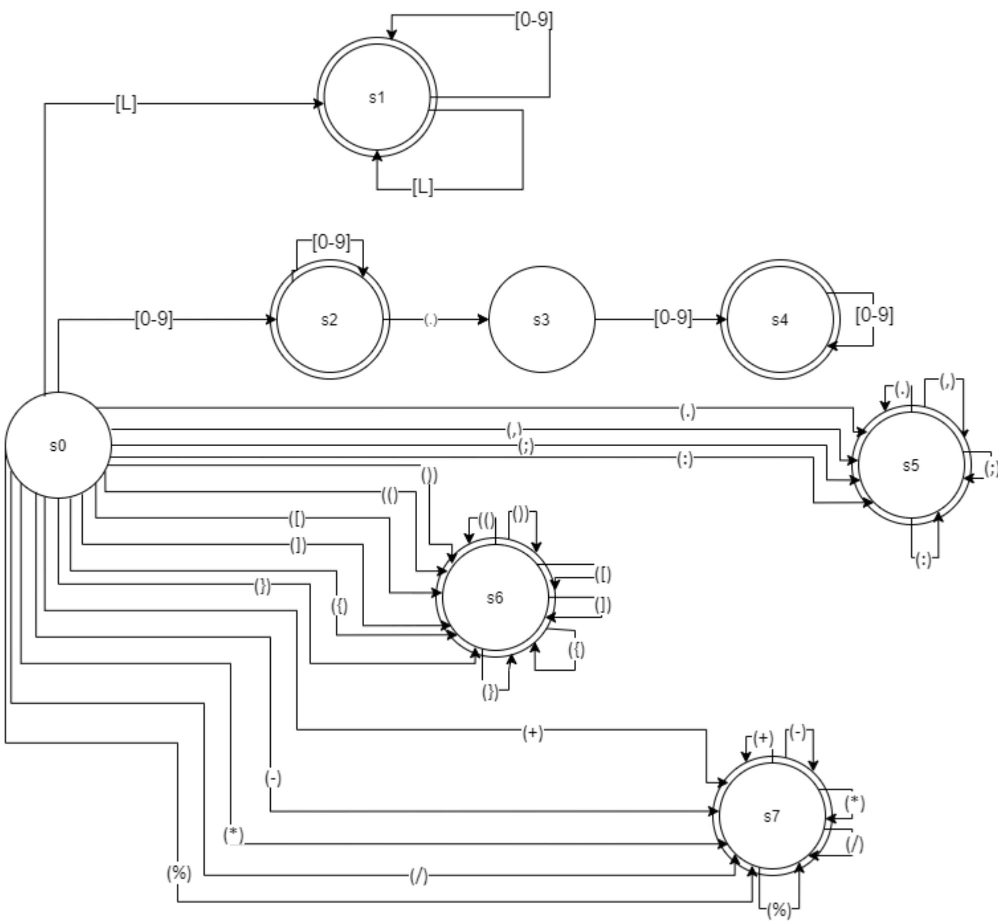


3.6.



4. Creación del AFD que acepte todos los tokens

4.1. Diagrama de transiciones del AFD



4.2. Tabla de transiciones del AFD

FT	s0	s1	s2	s3	s4	s5	s6	s7
L	∂(s0, [L])=s1	∂(s1, [L])=s1						
[0-9]	∂(s0, [0-9])=s2	∂(s1, [0-9])=s1	∂(s2, [0-9])=s2	∂(s3, [0-9])=s4	∂(s4, [0-9])=s4			
(.)	∂(s0, (.))=s5		∂(s2, (.))=s3			∂(s5, (.))=s5		
(,)	∂(s0, (,))=s5					∂(s5, (,))=s5		
(;)	∂(s0, (;))=s5					∂(s5, (;))=s5		
(:)	∂(s0, (:))=s5					∂(s5, (:))=s5		
(+)	∂(s0, (+))=s7							∂(s7, (+))=s7
(-)	∂(s0, (-))=s7							∂(s7, (-))=s7
(*)	∂(s0, (*))=s7							∂(s7, (*))=s7
(/)	∂(s0, (/))=s7							∂(s7, (/))=s7
(%)	∂(s0, (%))=s7							∂(s7, (%))=s7
(()	∂(s0, (())=s6						∂(s6, (())=s6	
())	∂(s0, ()))=s6						∂(s6, ()))=s6	
([)	∂(s0, ([))=s6						∂(s6, ([))=s6	
(])	∂(s0, (]))=s6						∂(s6, (]))=s6	
({)	∂(s0, ({))=s6						∂(s6, ({))=s6	
(})	∂(s0, (}))=s6						∂(s6, (}))=s6	