

Memoria de la Práctica de Procesadores de Lenguajes: Analizador Sintáctico

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1 Diseño del Analizador Sintáctico

1.1 Gramática

Terminales = { ; { } id ent cadena () + < ! = |= var int
boolean string print input , return function if else }

NoTerminales = { *P D T F T1 A K C S L M Q S1 G X E U R V S2* }

Axioma = *P*

Producciones = {

P → *D P*

P → *F P*

P → *S P*

D → *var T id ;*

T → *int*

T → *string*

T → *boolean*

F → *function T1 id (A) { C }*

T1 → λ

T1 → *T*

A → *T id K*

A → λ

K → λ

K → *, T id K*

C → *D C*

C → *S C*

C → λ

S → *id L E ;*

S → *id (M) ;*

S → *print (E) ;*

S → *input (id) ;*

S → *if (E) S1*

S → *return X ;*

L → |=

L → =

M → *E Q*

M → λ

Q → λ

Q → *, E Q*

S1 → { *S2* } *G*

S1 → *S*

G → *else { S2 }*

G → λ

X → *E*

X → λ

E → *E < U*

E → *U*

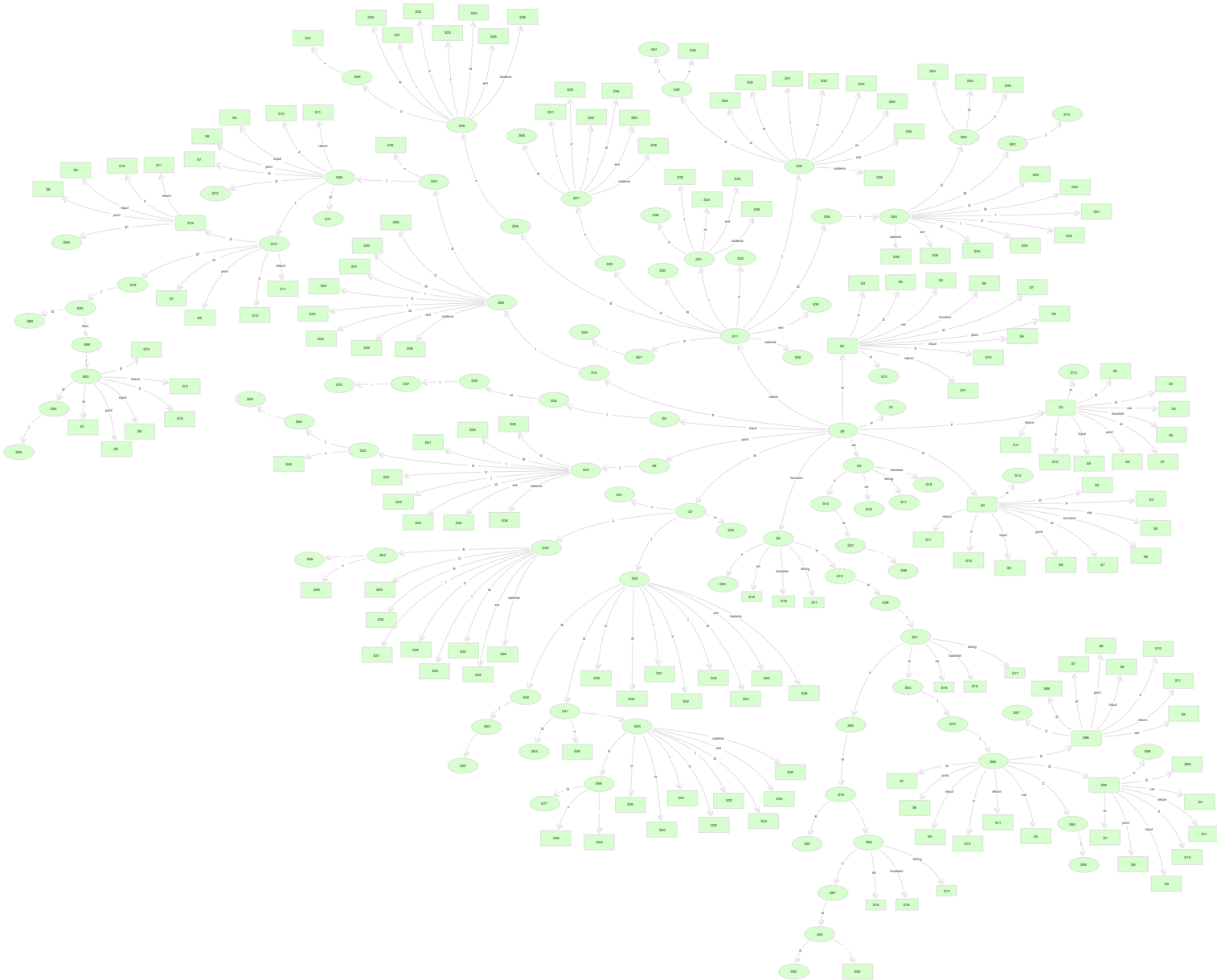
U → *U + R*

U → *R*

$$\begin{aligned}
R &\rightarrow ! V \\
R &\rightarrow V \\
V &\rightarrow (E) \\
V &\rightarrow id \\
V &\rightarrow id (M) \\
V &\rightarrow ent \\
V &\rightarrow cadena \\
S2 &\rightarrow S S2 \\
S2 &\rightarrow S \\
P &\rightarrow \lambda
\end{aligned}$$

}

1.2 Autómata Reconocedor de Prefijos Viables



1.2.1 Estados del autómata

$S_0 = \{P1 \rightarrow \bullet P, P \rightarrow \bullet DP, P \rightarrow \bullet SP, P \rightarrow \bullet , D \rightarrow \bullet \text{ var } T \text{ id}; ,$
 $F \rightarrow \bullet \text{ function } T1 \text{ id}(A)\{C\}, S \rightarrow \bullet \text{ id } L \text{ E}; , S \rightarrow \bullet \text{ id}(M);$
 $S \rightarrow \bullet \text{ print}(E); , S \rightarrow \bullet \text{ input}(\text{id}); , S \rightarrow \bullet \text{ if}(E) \text{ S1},$
 $S \rightarrow \bullet \text{ return } X;\}$
 $S_1 = \{P1 \rightarrow P \bullet\}$
 $S_2 = \{P \rightarrow D \bullet P, P \rightarrow \bullet DP, P \rightarrow \bullet SP, P \rightarrow \bullet , D \rightarrow \bullet \text{ var } T \text{ id}; ,$
 $F \rightarrow \bullet \text{ function } T1 \text{ id}(A)\{C\}, S \rightarrow \bullet \text{ id } L \text{ E}; , S \rightarrow \bullet \text{ id}(M);$
 $S \rightarrow \bullet \text{ print}(E); , S \rightarrow \bullet \text{ input}(\text{id}); , S \rightarrow \bullet \text{ if}(E) \text{ S1},$
 $S \rightarrow \bullet \text{ return } X;\}$
 $S_3 = \{P \rightarrow F \bullet P, P \rightarrow \bullet DP, P \rightarrow \bullet FP, P \rightarrow \bullet SP, P \rightarrow \bullet ,$
 $D \rightarrow \bullet \text{ var } T \text{ id}; , F \rightarrow \bullet \text{ function } T1 \text{ id}(A)\{C\},$
 $S \rightarrow \bullet \text{ id } L \text{ E}; , S \rightarrow \bullet \text{ id}(M); , S \rightarrow \bullet \text{ print}(E); ,$
 $S \rightarrow \bullet \text{ input}(\text{id}); , S \rightarrow \bullet \text{ if}(E) \text{ S1}, S \rightarrow \bullet \text{ return } X;\}$
 $S_4 = \{P \rightarrow S \bullet P, P \rightarrow \bullet DP, P \rightarrow \bullet FP, P \rightarrow \bullet SP, P \rightarrow \bullet ,$
 $D \rightarrow \bullet \text{ var } T \text{ id}; , F \rightarrow \bullet \text{ function } T1 \text{ id}(A)\{C\},$
 $S \rightarrow \bullet \text{ id } L \text{ E}; , S \rightarrow \bullet \text{ id}(M); , S \rightarrow \bullet \text{ print}(E); ,$
 $S \rightarrow \bullet \text{ input}(\text{id}); , S \rightarrow \bullet \text{ if}(E) \text{ S1}, S \rightarrow \bullet \text{ return } X;\}$
 $S_5 = \{D \rightarrow \text{ var } \bullet T \text{ id}; , T \rightarrow \bullet \text{ int } , T \rightarrow \bullet \text{ string } , T \rightarrow \bullet \text{ boolean}\}$
 $S_6 = \{F \rightarrow \text{ function } \bullet T1 \text{ id}(A)\{C\}, T1 \rightarrow \bullet , T1 \rightarrow \bullet T,$
 $T \rightarrow \bullet \text{ int } , T \rightarrow \bullet \text{ string } , T \rightarrow \bullet \text{ boolean}\}$
 $S_7 = \{S \rightarrow \text{ id } \bullet L \text{ E}; , S \rightarrow \text{ id } \bullet (M); , L \rightarrow | = , L \rightarrow \bullet =\}$
 $S_8 = \{S \rightarrow \text{ print } \bullet (E);\}$
 $S_9 = \{S \rightarrow \text{ input } \bullet (\text{id});\}$
 $S_{10} = \{S \rightarrow \text{ if } \bullet (E) \text{ S1}\}$
 $S_{11} = \{S \rightarrow \text{ return } \bullet X; , X \rightarrow \bullet , X \rightarrow \bullet E, E \rightarrow \bullet E < U, E \rightarrow \bullet U,$
 $U \rightarrow \bullet U + R, U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E),$
 $V \rightarrow \bullet \text{ id } , V \rightarrow \bullet \text{ id}(M), V \rightarrow \bullet \text{ ent } , V \rightarrow \bullet \text{ cadena}\}$
 $S_{12} = \{P \rightarrow DP \bullet\}$
 $S_{13} = \{P \rightarrow FP \bullet\}$
 $S_{14} = \{P \rightarrow SP \bullet\}$
 $S_{15} = \{D \rightarrow \text{ var } T \bullet \text{ id};\}$
 $S_{16} = \{T \rightarrow \text{ int } \bullet\}$
 $S_{17} = \{T \rightarrow \text{ string } \bullet\}$
 $S_{18} = \{T \rightarrow \text{ boolean } \bullet\}$
 $S_{19} = \{F \rightarrow \text{ function } T1 \bullet \text{ id}(A)\{C\}\}$
 $S_{20} = \{T1 \rightarrow T \bullet\}$
 $S_{21} = \{L \rightarrow = \bullet\}$
 $S_{22} = \{S \rightarrow \text{ id } (\bullet M); , M \rightarrow \bullet E \text{ Q}, M \rightarrow \bullet , E \rightarrow \bullet E < U, E \rightarrow \bullet U,$
 $U \rightarrow \bullet U + R, U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E),$
 $V \rightarrow \bullet \text{ id } , V \rightarrow \bullet \text{ id}(M), V \rightarrow \bullet \text{ ent } , V \rightarrow \bullet \text{ cadena}\}$
 $S_{23} = \{L \rightarrow | = \bullet\}$
 $S_{24} = \{S \rightarrow \text{ print } (\bullet E); , E \rightarrow \bullet E < U, E \rightarrow \bullet U, U \rightarrow \bullet U + R,$
 $U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E), V \rightarrow \bullet \text{ id } ,$
 $V \rightarrow \bullet \text{ id}(M), V \rightarrow \bullet \text{ ent } , V \rightarrow \bullet \text{ cadena}\}$
 $S_{25} = \{S \rightarrow \text{ input } (\bullet \text{id})\}$
 $S_{26} = \{S \rightarrow \text{ if } (\bullet E) \text{ S1}, E \rightarrow \bullet E < U, E \rightarrow \bullet U, U \rightarrow \bullet U + R,$
 $U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E), V \rightarrow \bullet \text{ id } ,$
 $V \rightarrow \bullet \text{ id}(M), V \rightarrow \bullet \text{ ent } , V \rightarrow \bullet \text{ cadena}\}$
 $S_{27} = \{S \rightarrow \text{ return } X \bullet ;\}$
 $S_{28} = \{X \rightarrow E \bullet , E \rightarrow E \bullet < U\}$
 $S_{29} = \{E \rightarrow U \bullet , U \rightarrow U \bullet + R\}$
 $S_{30} = \{U \rightarrow R \bullet\}$
 $S_{31} = \{R \rightarrow ! \bullet V, V \rightarrow \bullet (E), V \rightarrow \bullet \text{ id } , V \rightarrow \bullet \text{ id}(M),$
 $V \rightarrow \bullet \text{ ent } , V \rightarrow \bullet \text{ cadena}\}$
 $S_{32} = \{R \rightarrow V \bullet\}$
 $S_{33} = \{V \rightarrow (\bullet E), E \rightarrow \bullet E < U, E \rightarrow \bullet U, U \rightarrow \bullet U + R,$

$U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E), V \rightarrow \bullet id,$
 $V \rightarrow \bullet id(M), V \rightarrow \bullet ent, V \rightarrow \bullet cadena\}$
 $S_{34}=\{V \rightarrow id \bullet, V \rightarrow id \bullet (M)\}$
 $S_{35}=\{V \rightarrow ent \bullet\}$
 $S_{36}=\{V \rightarrow cadena \bullet\}$
 $S_{37}=\{D \rightarrow var T id \bullet;\}$
 $S_{38}=\{F \rightarrow function T1 id \bullet (A)\{C\}\}$
 $S_{39}=\{S \rightarrow id L \bullet E, E \rightarrow \bullet E < U, E \rightarrow \bullet U, U \rightarrow \bullet U + R,$
 $U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E), V \rightarrow \bullet id,$
 $V \rightarrow \bullet id(M), V \rightarrow \bullet ent, V \rightarrow \bullet cadena\}$
 $S_{40}=\{S \rightarrow id (M \bullet);\}$
 $S_{41}=\{M \rightarrow E \bullet Q, E \rightarrow E \bullet < U, Q \rightarrow \bullet, Q \rightarrow \bullet ,EQ\}$
 $S_{42}=\{S \rightarrow print(E \bullet);, E \rightarrow E \bullet < U\}$
 $S_{43}=\{S \rightarrow input(id \bullet);\}$
 $S_{44}=\{S \rightarrow if(E \bullet) S1, E \rightarrow E \bullet < U\}$
 $S_{45}=\{S \rightarrow return X; \bullet\}$
 $S_{46}=\{E \rightarrow E < \bullet U, U \rightarrow \bullet R, U \rightarrow \bullet U + R, R \rightarrow \bullet ! V, R \rightarrow \bullet V$
 $V \rightarrow \bullet (E), V \rightarrow \bullet id, V \rightarrow \bullet id(M), V \rightarrow \bullet ent, V \rightarrow \bullet cadena\}$
 $S_{47}=\{U \rightarrow U + \bullet R, R \rightarrow \bullet ! V, V \rightarrow \bullet (E), V \rightarrow \bullet id(M),$
 $V \rightarrow \bullet ent, V \rightarrow \bullet cadena\}$
 $S_{48}=\{R \rightarrow ! V \bullet\}$
 $S_{49}=\{V \rightarrow (E \bullet), E \rightarrow E \bullet < U\}$
 $S_{50}=\{V \rightarrow id(\bullet M), M \rightarrow \bullet E Q, M \rightarrow \bullet, E \rightarrow \bullet E < U, E \rightarrow \bullet U,$
 $U \rightarrow \bullet U + R, U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E),$
 $V \rightarrow \bullet id, V \rightarrow \bullet id(M), V \rightarrow \bullet ent, V \rightarrow \bullet cadena\}$
 $S_{51}=\{F \rightarrow function T1 id(\bullet A)\{C\}, A \rightarrow \bullet T id K, A \rightarrow \bullet, T \rightarrow \bullet int,$
 $T \rightarrow \bullet string, T \rightarrow \bullet boolean\}$
 $S_{52}=\{S \rightarrow id L E \bullet; , E \rightarrow E \bullet < U\}$
 $S_{53}=\{S \rightarrow id(M) \bullet; \}$
 $S_{54}=\{M \rightarrow E Q \bullet\}$
 $S_{55}=\{Q \rightarrow \bullet E Q, E \rightarrow \bullet E < U, E \rightarrow \bullet U,$
 $U \rightarrow \bullet U + R, U \rightarrow \bullet R, R \rightarrow \bullet ! V, R \rightarrow \bullet V, V \rightarrow \bullet (E),$
 $V \rightarrow \bullet id, V \rightarrow \bullet id(M), V \rightarrow \bullet ent, V \rightarrow \bullet cadena\}$
 $S_{56}=\{S \rightarrow print(E) \bullet; \}$
 $S_{57}=\{S \rightarrow input(id) \bullet; \}$
 $S_{58}=\{S \rightarrow if(E) \bullet S1, S1 \rightarrow \bullet \{S2\}G, S1 \rightarrow \bullet S, S \rightarrow \bullet id L E; ,$
 $S \rightarrow \bullet id(M); , S \rightarrow \bullet print(E); , S \rightarrow \bullet input(id); ,$
 $S \rightarrow \bullet if(E)S1, S \rightarrow \bullet return X; \}$
 $S_{59}=\{E \rightarrow E < U \bullet, U \rightarrow U \bullet + R\}$
 $S_{60}=\{U \rightarrow U + R \bullet\}$
 $S_{61}=\{V \rightarrow (E) \bullet\}$
 $S_{62}=\{V \rightarrow id(M \bullet)\}$
 $S_{63}=\{M \rightarrow E \bullet Q, E \rightarrow E \bullet < U, Q \rightarrow \bullet, Q \rightarrow \bullet ,EQ\}$
 $S_{64}=\{F \rightarrow function T1 id(A \bullet)\{C\}\}$
 $S_{65}=\{A \rightarrow T \bullet id K\}$
 $S_{66}=\{S \rightarrow id L E ; \bullet\}$
 $S_{67}=\{S \rightarrow id (M); \bullet\}$
 $S_{68}=\{Q \rightarrow ,E \bullet Q, E \rightarrow E \bullet < U, Q \rightarrow \bullet, Q \rightarrow \bullet ,EQ\}$
 $S_{69}=\{S \rightarrow print(E); \bullet\}$
 $S_{70}=\{S \rightarrow input(id); \bullet\}$
 $S_{71}=\{S \rightarrow if(E) S1 \bullet\}$
 $S_{72}=\{S1 \rightarrow \{\bullet S2\}G, S2 \rightarrow \bullet S S2, S2 \rightarrow \bullet S, S \rightarrow \bullet id L E; ,$
 $S \rightarrow \bullet id(M); , S \rightarrow \bullet print(E); , S \rightarrow \bullet input(id); ,$
 $S \rightarrow \bullet if(E)S1, S \rightarrow \bullet return X; \}$
 $S_{73}=\{S1 \rightarrow S \bullet\}$
 $S_{74}=\{S2 \rightarrow S \bullet S2 , S2 \rightarrow S \bullet , S2 \rightarrow \bullet S S2, S2 \rightarrow \bullet S,$
 $S \rightarrow \bullet id L E ; , S \rightarrow \bullet id (M) ; , S \rightarrow \bullet print (E) ; ,$
 $S \rightarrow \bullet input (id) ; , S \rightarrow \bullet if (E) S1, S \rightarrow \bullet return X ; \}$

$S_{75}=\{F \rightarrow \text{function } T1 \text{ id } (K) \bullet \{C\}\}$
 $S_{76}=\{A \rightarrow T \text{ id } \bullet K, K \rightarrow \bullet, K \rightarrow \bullet, T \text{ id } K\}$
 $S_{77}=\{Q \rightarrow, E Q \bullet\}$
 $S_{78}=\{S1 \rightarrow \{S2 \bullet\} G\}$
 $S_{79}=\{S2 \rightarrow S \bullet S2, S2 \rightarrow S \bullet, S2 \rightarrow \bullet S S2, S \rightarrow \bullet \text{id } L E;, \\ S \rightarrow \bullet \text{id}(M);, S \rightarrow \bullet \text{print}(E); S \rightarrow \bullet \text{if}(E)S1;, \\ S \rightarrow \bullet \text{input}(\text{id});, S \rightarrow \text{return } X;\}$
 $S_{80}=\{F \rightarrow \text{function } T1 \text{ id } (K) \{ \bullet C \}, C \rightarrow \bullet D C, C \rightarrow \bullet, \\ D \rightarrow \bullet \text{var } T \text{ id };, S \rightarrow \bullet \text{id } L E, S \rightarrow \bullet \text{id } (M);, \\ S \rightarrow \bullet \text{print } (E);, S \rightarrow \bullet \text{input } (\text{id});, S \rightarrow \bullet \text{if } (E) S1, \\ S \rightarrow \bullet \text{return } X ;\}$
 $S_{81}=\{A \rightarrow T \text{ id } K \bullet\}$
 $S_{82}=\{K \rightarrow, \bullet T \text{ id } K, T \rightarrow \bullet \text{int}, T \rightarrow \bullet \text{string}, T \rightarrow \bullet \text{boolean}\}$
 $S_{83}=\{S1 \rightarrow \{S2\} \bullet G, G \rightarrow \bullet \text{else } \{S2\}, G \rightarrow \bullet\}$
 $S_{84}=\{F \rightarrow \text{function } T1 \text{ id } (K) \{C \bullet\}\}$
 $S_{85}=\{C \rightarrow D \bullet C, C \rightarrow \bullet D C, C \rightarrow \bullet S C, C \rightarrow \bullet, D \rightarrow \bullet \text{var } T \text{ id };, \\ S \rightarrow \bullet \text{id } L E ;, S \rightarrow \bullet \text{id } (M) ;, S \rightarrow \bullet \text{print } (E) ;, \\ S \rightarrow \bullet \text{input } (\text{id }) ;, S \rightarrow \bullet \text{if } (E) S1, S \rightarrow \bullet \text{return } X ;\}$
 $S_{86}=\{C \rightarrow S \bullet C, C \rightarrow \bullet D C, C \rightarrow \bullet S C, C \rightarrow \bullet, D \rightarrow \bullet \text{var } T \text{ id };, \\ S \rightarrow \bullet \text{id } L E ;, S \rightarrow \bullet \text{id } (M) ;, S \rightarrow \bullet \text{print } (E) ;, \\ S \rightarrow \bullet \text{input } (\text{id }) ;, S \rightarrow \bullet \text{if } (E) S1, S \rightarrow \bullet \text{return } X ;\}$
 $S_{87}=\{K \rightarrow, T \bullet \text{id } K\}$
 $S_{88}=\{S1 \rightarrow \{S2\} G \bullet\}$
 $S_{89}=\{G \rightarrow \text{else } \bullet \{S2\}\}$
 $S_{90}=\{F \rightarrow \text{function } T1 \text{ id } (K) \{C\} \bullet\}$
 $S_{91}=\{K \rightarrow, T \text{ id } \bullet K, K \rightarrow \bullet, K \rightarrow \bullet, T \text{ id } K\}$
 $S_{92}=\{G \rightarrow \text{else } \{ \bullet S2 \}, S2 \rightarrow \bullet S S2, S2 \rightarrow \bullet S, S \rightarrow \bullet \text{id } L E ;, \\ S \rightarrow \bullet \text{id } (M) ;, S \rightarrow \bullet \text{print } (E) ;, S \rightarrow \bullet \text{input}(\text{id});, \\ S \rightarrow \bullet \text{if } (E) S1, S \rightarrow \bullet \text{return } X ;\}$
 $S_{93}=\{K \rightarrow, T \text{ id } K \bullet\}$
 $S_{94}=\{G \rightarrow \text{else } \{ S2 \bullet \}\}$
 $S_{95}=\{G \rightarrow \text{else } \{ S2 \} \bullet\}$
 $S_{96}=\{C \rightarrow D C \bullet\}$
 $S_{97}=\{C \rightarrow S C \bullet\}$
 $S_{98}=\{D \rightarrow \text{var } T \text{ id }; \bullet\}$
 $S_{99}=\{S2 \rightarrow S S2 \bullet\}$

1.3 Conflictos y Tabla de Decisión

Como podemos observar en la tabla de decisión no hay ningún conflicto.

Los posibles conflictos son:

Reducción-Reducción

Podríamos ver como en los posibles estados con este conflicto, en nuestro caso ninguno, se verifica que

$\forall \{A \rightarrow \alpha \bullet, B \rightarrow \beta \bullet\} \subset S_x \Rightarrow \text{Follow}(A) \cap \text{Follow}(B) = \emptyset$ (Esto lo podemos observar al no tener dos entradas de reducción en la misma celda de cada fila de S_x)

Reducción-Desplazamiento

Podemos ver como en los posibles estados con este conflicto, $S_0, S_2, S_3, S_4, S_6, S_{11}, S_{22}, S_{28}, S_{29}, S_{34}, S_{41}, S_{50}, S_{51}, S_{59}, S_{63}, S_{68}, S_{76}, S_{79}, S_{80}, S_{83}, S_{85}, S_{86}, S_{91}$, se verifica

$\forall \{A \rightarrow \alpha \bullet b \gamma, C \rightarrow \beta \bullet\} \subset S_x \Rightarrow b \notin \text{Follow}(C)$ (Esto lo podemos observar al no tener una entrada de desplazamiento y otra de reducción en la misma celda de cada fila de S_x)

Por ejemplo, para los estados S_0, S_2, S_3, S_4 : $\{\text{var, function, id, print, input, if, return}\} \notin \text{Follow}(P) = \{ \$ \}$
En el estado S_6 : $\{\text{int, string, boolean}\} \notin \text{Follow}(T1) = \{ \text{id} \}$
Y así sucesivamente con el resto de estados.

	:	{	}	id	entero	cadena	()	+	<	!	=		=	var	int	boolean	string	print	input	,	return	function	if	else	\$	P	D	T	F	T	A	K	C	S	L	M	Q	S'	G	X	E	U	R	V	S						
S0				d7											d5				d8	d9			d11	d6	d10	r49	1	2	3						4																	
S1																										a																										
S2				d7											d5				d8	d9			d11	d6	d10	r49	12	2	3						4																	
S3				d7											d5				d8	d9			d11	d6	d10	r49	13	2	3						4																	
S4				d7											d5				d8	d9			d11	d6	d10	r49	14	2	3						4																	
S5																																																				
S6				r9															d16	d18	d17																															
S7						d22						d21	d23																																							
S8						d24																																														
S9						d25																																														
S10						d26																																														
S11	r35			d34	d35	d36	d33				d31																																									
S12																																																				
S13																																																				
S14																																																				
S15				d37																																																
S16				r5																																																
S17				r6																																																
S18				r7																																																
S19				d38																																																
S20				r10																																																
S21				r25	r25	r25					r25																																									
S22				d34	d35	d36	d33	r27			d31																																									
S23				r24	r24	r24					r24																																									
S24				d34	d35	d36	d33				d31																																									
S25				d43																																																
S26				d34	d35	d36	d33				d31																																									
S27	d45																																																			
S28	r34																																																			
S29	r37										r37	d47	r37																																							
S30	r39										r39	r39	r39																																							
S31				d34	d35	d36	d33																																													
S32	r41										r41	r41	r41																																							
S33				d34	d35	d36	d33				d31																																									
S34	r43										d50	r43	r43																																							
S35	r45										r45	r45	r45																																							
S36	r46										r46	r46	r46																																							
S37	d98																																																			
S38											d51																																									
S39				d34	d35	d36	d33				d31																																									
S40																																																				
S41																																																				

1.4 Errores

En las celdas vacías de cada fila se lanzan los siguientes errores:

S₀, S₄, S₇, S₁₄, S₈₅, S₈₆, S₉₆, S₉₇: Error 1: “Sentencia no válida”

S₁: Error -1 : “No se pudo derivar la raíz”

S₂, S₅, S₁₂, S₁₅, S₃₇, S₉₈: Error 2: “Declaración incorrecta de variable”

S₃, S₆, S₁₃, S₁₉, S₃₈, S₅₁, S₆₄, S₆₅, S₇₅, S₇₆, S₈₀, S₈₁, S₈₂, S₈₄, S₈₇, S₉₀, S₉₁, S₉₃:
Error 3: “Declaración incorrecta de función”

S₈, S₂₄, S₄₂, S₅₆, S₆₉: Error 4: “Sentencia print incorrecta”

S₉, S₂₅, S₄₃, S₅₇, S₇₀: Error 5: “Sentencia input incorrecta”

S₁₀, S₂₆, S₄₄, S₅₈, S₇₁, S₇₃: Error 6: “Sentencia condicional simple incorrecta”

S₁₁, S₂₇, S₂₈, S₄₅: Error 7: “Sentencia return incorrecta”

S₁₆, S₁₇, S₁₈, S₂₀: Error 8: “Tipo incorrecto”

S₂₁, S₂₃, S₃₉, S₅₂, S₆₆: Error 9: “Asignación incorrecta”

S₂₂, S₄₀, S₄₁, S₅₃, S₅₄, S₅₅, S₆₃, S₆₇, S₆₈, S₇₇: Error 10: “Llamada a función incorrecta”

S₂₉, S₃₀, S₃₁, S₃₂, S₃₃, S₃₄, S₃₅, S₃₆, S₄₆, S₄₇, S₄₈, S₄₉, S₅₀, S₅₉, S₆₀, S₆₁, S₆₂, S₇₄:
Error 11: “Expresión incorrecta”

S₇₂, S₇₈, S₇₉, S₈₃, S₈₈, S₈₉, S₉₂, S₉₄, S₉₅, S₉₉ : Error 12 “Sentencia condicional compuesta incorrecta”

2 Anexo de Pruebas

Error 1:

```
1 var int a;  
2 var b;  
3 a = 3;  
4 b = a;  
5 if (a < b) b = 1;  
6 if (b < a) b = 8;  
7 a = a + b;  
8 print (a);  
9 print (b);
```

```
> Error Sintactico: Declaracion incorrecta de variable. Linea: 2
```

Error 2:

```
1 var string texto;
2 function pideTexto ()
3 {
4     print ('Introduce un texto');
5     input (texto);
6 }
7 function imprime (string msg,)
8 {
9     print (msg);
10 }
11 pideTexto();
12 var string textoAux;
13 textoAux = texto;
14 imprime (textoAux);
```

> Error Sintactico: Declaracion incorrecta de funcion. Linea: 7

Error 3:

```
1 var int a;
2 var int b;
3 a = 3;
4 b = a;
5 var boolean c;
6 c = a < b;
7 if (c) {
8     b = 1;
9 } else {
10 c = b < a;
11 if (c) b = 4;
12 a = a + b;
13 print (a);
14 print (b);
```

> Error Sintactico: Sentencia condicional compuesta incorrecta. Linea: 14

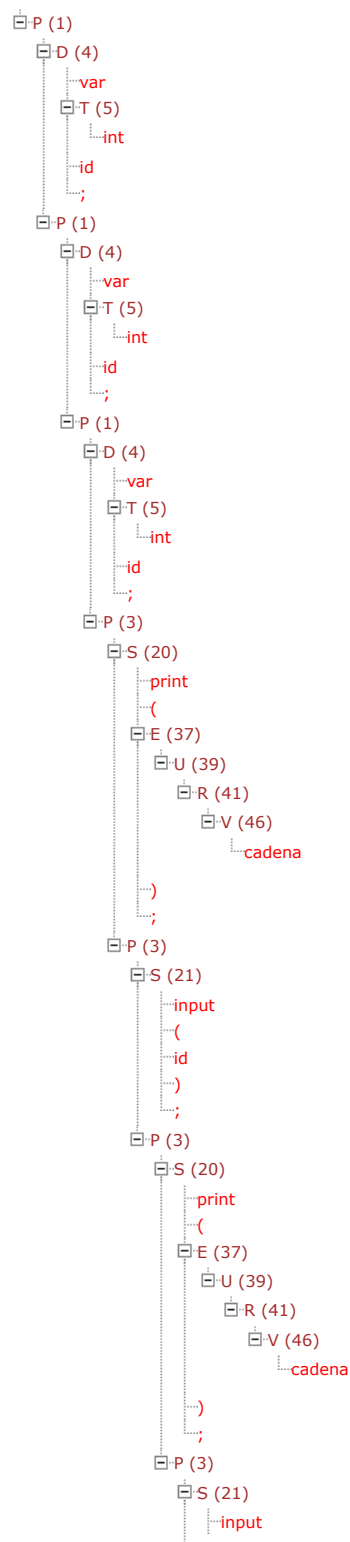
Prueba 1 Correcta:

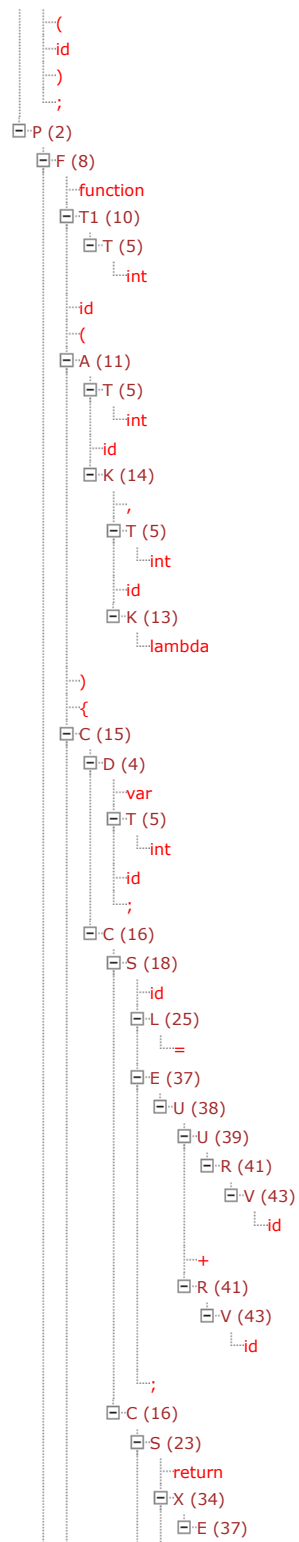
```
1 var int a;
2 var int b;
3 var int c;
4 print ('Introduce el primer operando');
5 input (a);
6 print ('Introduce el segundo operando');
7 input (b);
8 function int suma (int num1, int num2)
9 {
10     var int res;
11     res = num1+num2;
12     return res;
13 }
14 c = suma (a, b);
15 print (c);
```

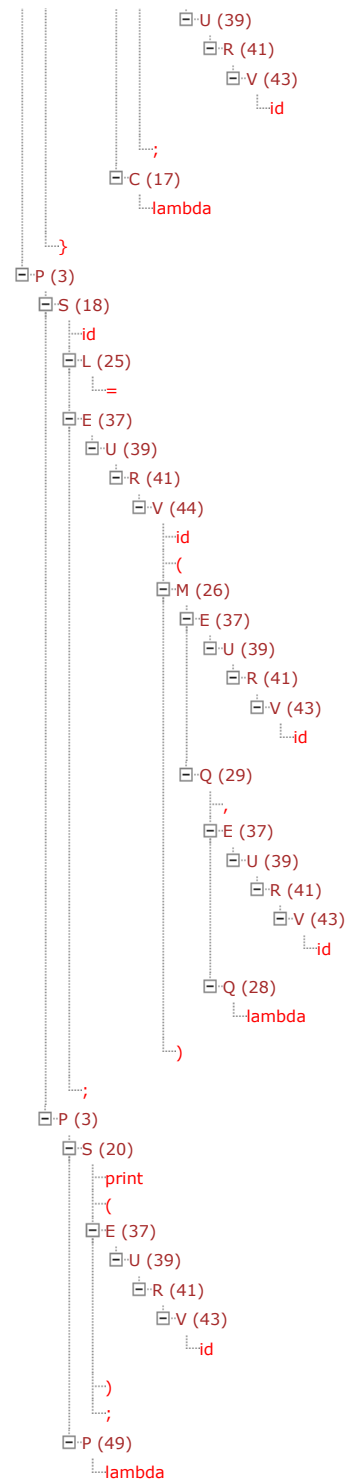
Parse a Derechas:

A 5 4 5 4 5 4 46 41 39 37 20 21 46 41 39 37 20 21 5 10 5 5 13 14 11 5 4 25 43 41 39 43
41 38 37 18 43 41 39 37 34 23 17 16 16 15 8 25 43 41 39 37 43 41 39 37 28 29 26 44 41
39 37 18 43 41 39 37 20 49 3 3 2 3 3 3 3 1 1 1

Árbol sintáctico:







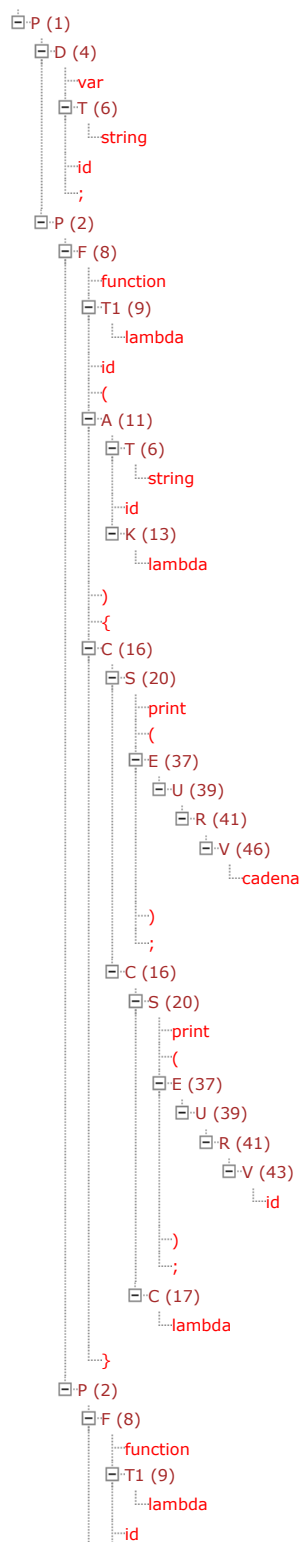
Prueba 2 Correcta:

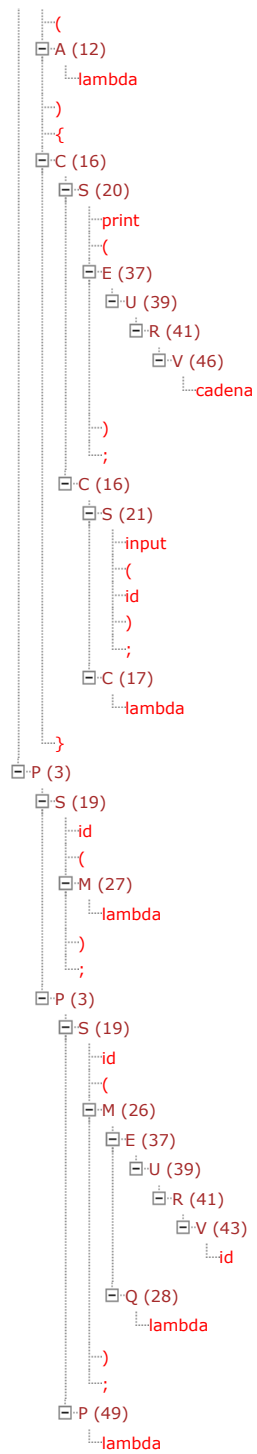
```
1 var string texto;
2 function imprime (string msg)
3 {
4     print ('Mensaje introducido:');
5     print (msg);
6 }
7 function pideTexto ()
8 {
9     print ('Introduce un texto');
10    input (texto);
11 }
12 pideTexto();
13 imprime (texto);
```

Parse a Derechas:

A 6 4 9 6 13 11 46 41 39 37 20 43 41 39 37 20 17 16 16 8 9 12 46 41 39 37 20 21 17 16
16 8 27 19 43 41 39 37 28 26 19 49 3 3 2 2 1

Árbol sintáctico:





Prueba 3 Correcta:

```
1 var string s;
2 var int uno;
3 var int UNO;
4 function int Factorial (int n)
5 {
6     if (n < 0) return 1;
7     return n + Factorial (n + 1);
8 }
9 var int For;
10 var int functional;
11 var int While;
12
13 function imprime (string s, string msg, int f)
14 {
15     print (s); print (msg); print (f);
16     return;
17 }
18 function string cadena (boolean log)
19 {
20     if (!log)
21     {
22         imprime (s, 'hola', 33);
23         if (uno < UNO) return s;
24     }
25     else
26     {
27         return 'Fin';
28     }
29 }
30 s = 'El factorial ';
31
32 print (s);
33 print ('Introduce un numero.');
```

```
34 input (num);
35 var
36 boolean
37 booleano;
38 if (num < 0) print ('No existe el factorial de un negativo.');
```

```
39 imprime (cadena (booleano), 'recursivo es: ', Factorial (num));
```

Parse a Derechas:

A 6 4 5 4 5 4 5 10 5 13 11 43 41 39 37 45 41 39 36 45 41 39 37 34 23 31 22 43 41 39
43 41 39 45 41 38 37 28 26 44 41 38 37 34 23 17 16 16 8 5 4 5 4 5 4 9 6 6 5 13 14 14
11 43 41 39 37 20 43 41 39 37 20 43 41 39 37 20 35 23 17 16 16 16 16 8 6 10 7 13 11
43 40 39 37 43 41 39 37 46 41 39 37 45 41 39 37 28 29 29 26 19 43 41 39 37 43 41 39
36 43 41 39 37 34 23 31 22 48 47 46 41 39 37 34 23 48 32 30 22 17 16 8 25 46 41 39 37
18 43 41 39 37 20 46 41 39 37 20 21 7 4 43 41 39 37 45 41 39 36 46 41 39 37 20 31 22
43 41 39 37 28 26 44 41 39 37 46 41 39 37 43 41 39 37 28 26 44 41 39 37 28 29 29 26
19 49 3 3 1 3 3 3 3 2 2 1 1 1 2 1 1 1

Árbol sintáctico:

